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EKISTICS

HOUSING AND PLANNING ABSTRACTS

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ΟΙΚΙΣΤΙΚΗ

FEBRUARY 1958

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E K I S T I C S

HOUSING & PLANNING ABSTRACTS

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EDITORIAL

Though EKISTICS in its present from is still very young, its predecessor - The Tropical Housing and Planning Monthly Bulletin - started to issue similar abstracts of articles and papers relating to housing and planning as far back as October 1955. Appearing concurrently with the present issue, therefore, is a Cumulative Index, or listing of all material which was referred to in the parent publication.

A great number and variety of publications concerned with housing have suggested themselves for inclusion - as extracts - this month. Among them two very sound articles on building materials: Cytryn's comprehensive study of the properties of earth and soil for building purposes, and the United Nations' survey of the use of wood and its products.

The question of the best utilization of space in housing is one that is now again interesting many people. We have moved from the "minimum standards" of the 1930's to more sophisticated studies and a major investigation is under way by the Housing Division of the United Nations Economic Commission for Europe. In view of this revived interest we have given some space to an abstract of a United Nations publication of a few years back, and have also included an effort in the development of minimal standards by the Union Internationale des Organismes Familiaux, though the special preoccupations of the method they employ demand rather careful scrutiny.

Ventilation and fenestration, especially in the warmer climates, are prime considerations in housing. Of the several good discussions which have appeared recently, two have been selected. Webb's work on equatorial ventilation is conducted on an admirable level of research -- and as such it will have wide influence. The studies of the French Bureau Central d'Etudes pour les Equipements d'Outre-Mer on windows and ventilation in tropical areas will have special implications for low-cost housing.

The importance of other aspects of housing than the physical and structural are brought forcibly to mind by two studies in the cultural and geographically separated regions of Bolivia and Iraq. These serve to remind us of the urgency of social needs and demands, and of the power of the political appeal of housing.

The distinction between housing and planning is sometimes far from clear. The work of the Philadelphia Redevelopment Authority at Eastwick is a good example of an almost complete merger of the two fields. Here imaginative new designs for row housing are fully integrated with the lay-out of residential blocks and the consequent street, parking and open space patterns.

At another level, we are happy in this issue to include reports of two non-technical accounts of housing and planning developments in Soviet Russia and India's new steel towns.

Long term considerations in planning for underdeveloped countries is often too easily brushed aside. This is put into careful perspective by the meticulous examination of the possible applications of atomic energy to such countries by Netschert and Schurt. Our final extract reporting the projected creation of a United Nations Economic Development Fund also points up the growing recognition of long term planning needs.

EKISTICS is compiled by Yvette and Lawrence Mann under the direction of Prof. J. Tyrwhitt. Enquiries or comments should be addressed to 77 Trowbridge Street, Cambridge, Massachusetts, USA

NOTE: The lettering at the top of each page refers to Doxiadis Associates system of classification. The figures below each title refer to the Universal Decimal Classification.

HOUSING

C.E.T.U.

The Architects' Journal, News
SOLAR HOUSE WINNERS
October 17, 1957, pp. 579-580. Illustrations p. 577.
728.06.063 (25)

1. This is a brief report on the announcement of winners of the International Solar House Architectural Competition. The announcement was made by Jan Oostermeyer, President of the Association for Applied Solar Energy. The competition had as its purpose "to obtain original designs for a residence especially adapted to 'living with the sun' on an irrigated desert site north of Scottsdale, Arizona, USA" (See HIB-GA 25).

2. The first prize was awarded to Peter R. Lee, a senior student in architecture at the University of Minnesota. The prize was $2,500. Mr. Lee was affiliated with Mr. R.L. Bliss, senior partner in the architectural firm of Bliss and Campbell, Minneapolis, Minnesota. In commenting on the choice of Lee's design for the first prize, Dean Pietro Belluschi of MIT, the chairman of the jury said:

> "Among the outstanding merits of the winning entry were its directness and sense of unity, and the logic of its solar equipment, which acts in the double capacity of shade louvres in the summer and heat collectors in the winter."

3. The second prize was awarded to Mrs. Anna C. Bliss (Mrs. R.L. Bliss), the junior partner in Bliss and Campbell. Dean Belluschi had this to say about the entry by Mrs. Bliss:

> "The main appeal of this design lies in the fact that the solar collectors themselves produce the architectural quality of the house. The disposition of these collectors keeps the house from becoming too severe in appearance."

4. Third prize went to an international team of two former students of the Graduate School of Architecture, Massachusetts Institute of Technology. They were John N. Morphett of South Australia and Hanford Yang of China.

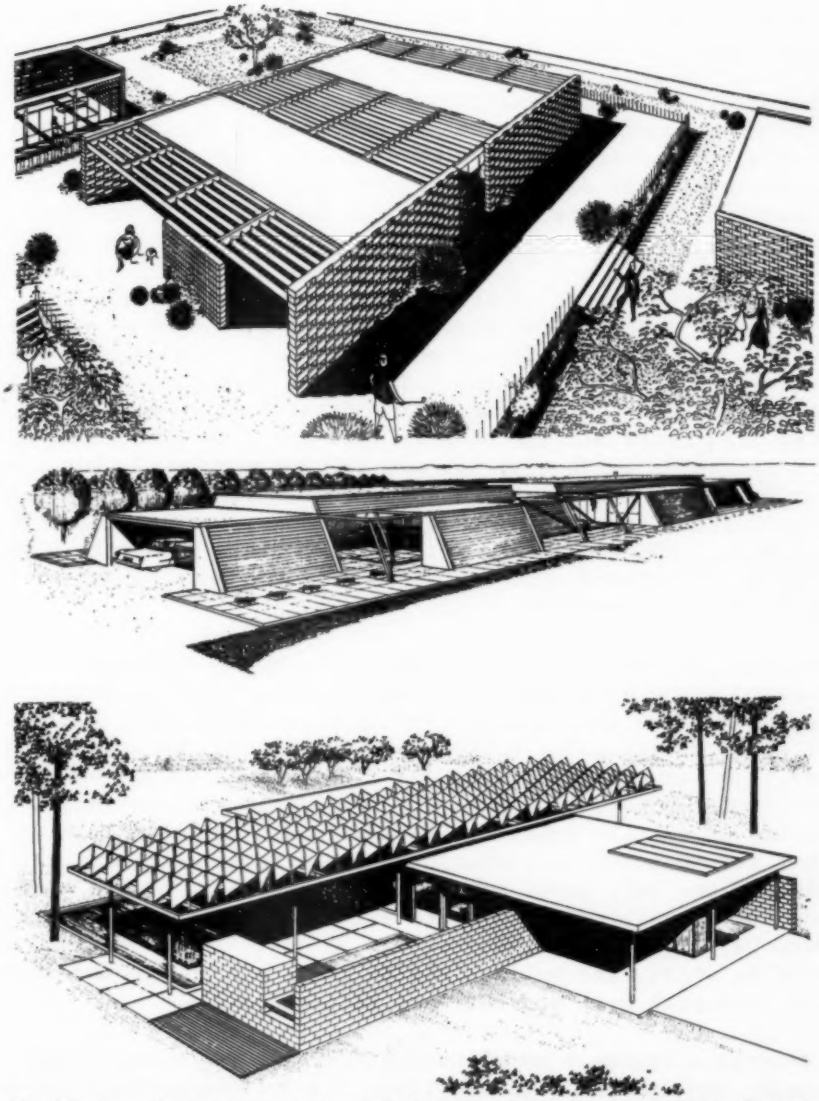
5. The five-man jury which selected the winning designs was composed of the following members: Dean Belluschi; Carlos Contreas, from Mexico City; Thomas Creighton, Editor of Progressive Architecture, New York; Nathaniel Owings, of Skidmore, Owings & Merrill, San Francisco; and James Elmore, of Phoenix, Arizona. The jury considered 113 entries submitted by architects and designers from 13 nations.

6. The competition will bear results, for according to plans of the Association for Applied Solar Energy:

> "The prize-winning house will be built as soon as the detailed plans can be completed. Its solar collectors will supply the heat needed to keep the residence comfortably warm during the winter, to heat the domestic water, and to warm the swimming pool which is an integral feature of the design. Auxiliary heat will be supplied by an electrically-operated heat pump, which will also provide summer cooling. Storage of heated water in winter and chilled water in summer will be in a large buried tank. The engineering of the installation will be done by the Albuquerque (New Mexico) firm of Bridgers and Paxton, who designed and built the world's first solar-heated office building."

The Architects' Journal. Solar House Winners -2

"The solar house will be put on public exhibition early in the spring of 1958. It will then be used as a living laboratory by the Association for Applied Solar Energy and will be the centre of interest at the first Solar House Symposium, which will be held in September of 1958 by the Association in co-operation with the University of Arizona and Arizona State College at Tempe."



The first three winning designs in America's international solar house competition. Top: by Peter R. Lee, affiliated with R. L. Bliss (America). Centre: by Anna C. Bliss (America). Bottom: by John N. Morphett (South Australia) and Hanford Yang (of China). More details on page 579.

E.N.S.T.U.

Bowman, Waldo G.
IRAQ'S OPERATION BOOTSTRAP (part one "A Modern Mesopotamia is Molded"
Engineering News-Record, December 12, 1957. pp. 34-54.
728 (56)

1. We extract here from the section on housing, entitled "Mud and Straw won't do." Mr. Bowman, Editor of Engineering News-Record has prepared a very impressive survey of Iraq's development effort. But concentration is on American contributions to the work

2. "Iraq's housing needs are every bit as formidable as its water and road requirements--and more pressing politically. Promised something much better than the mud and straw huts of the past, the Iraqi people are becoming impatient for more visible progress than the Board has been able to show. The task is a difficult one because the need is so great, so widely dispersed over the country and complicated by a scarcity of building material and skilled building labor. Nevertheless, the adopted program of constructing 25,000 housing during the next five years - and in the meantime experimenting with different designs and materials by letting small jobs to fifteen different builders from almost as many countries --should begin to bear fruit. To date nearly 4,000 housing units are under construction in Baghdad, 2,000 in Basra, 2,000 in Mosul and 700 in Kirkuk."

3. Criticism of the conduct of the experimental program is described:
"Although all fifteen jobs are far enough along to permit some decisions as to which are successful and should be tried out full scale, none of the jobs started so far has followed the new designs. This is a matter of concern to some government officiels, who feel that the foreign contractors may become discouraged and go home, whereas Iraq needs all the help in this field it can obtain during this period when it is trying to develop its own skilled workers." But the worth of the program as a necessary step in the advancement of the country's housing effort is recognized. Price ranges, information exchange, training of workmen with machinery, comparison and experience with new materials (concrete block, stabilized earth brick, fiberboard, precast structural elements, asbestos cement, foam concrete, etc.) all are benefits of the program.

4. The U.S. firm. IBEC Housing Corp., (Rockefeller company of Puerto Rican success) has instituted a basic research program to guide it in selecting building types and materials. "The first study covered eight subjects: evaluation of climate data of Baghdad; radiation effects; orientation of buildings, shadings; wind effects; color; cooling possibilities; and effect of materials on temperature balance. Among the useful conclusions were the following: the radiation of the roof exceeds the total of all the walls; buildings should be faced about 25 deg. east of south to get the most sun in winter, the least in summer; east and west sides should be closed, and only small openings should be used on the north to obtain benefit from the prevailing north-south air movement; shading should be provided at the windows, with the overhang set at 60 deg. It was decided also that the roof should be white, the walls light in color and the ground around the building dark so as to absorb heat and cut down reflection."

5. Looking for materials having a good insulative value yet dense enough to hold some of the night coolness into the daytime, the following materials were investigated by IBEC; expanded clay aggregate concrete, sand and gravel concrete with a high air content, pumice and gravel aggregate concrete, no-fines concrete, structural gypsum, stabilized earth, and cellular concrete eigher for insulation of for structural use. A sandwich type wall with a high insulation foam concrete inside stone concrete surfaces was finally selected.

Bowman, Waldo G. Iraq's Operation Bootstrap -2

"In the sandwich finally used in the Iraq project, IBEC chose a 2.5 in. foam core with a 1.5 in. dense concrete surface either side made with 1/4 in. aggregate. The wall panels cast in this design were 5 ft. wide and 30 ft. long; they were only 1.5 in. thick but had 7 in. flanges around the edges. They weighed 2 tons each. For additional insulation, the roof was over laid with asphalt and a mixture of clay and chopped straw applied in two layers. Partitions were made of stone concrete 4 in. thick.

6. This contract covered twenty 2 story row houses of wall bearing design without structural frame. All elements were produced on the site using Iraqi labor for both manual and mechanical jobs.

"Despite the use of a building design that departed farther from normal than any of the others used, the IBEC houses were built in the shortest time."

E.S.T.

Bureau Central d'Etudes pour les Equipements d'Outre-Mer
LA FENETRE DANS LE LOGEMENT ECONOMIQUE EN CLIMAT TROPICAL
Service de l'Habitat et de l'Urbanisme, Bulletin d'Informations No. 3. 1957. (Illustrations) pp. 21-27. (in French)
69.028.23

1. A type of window for tropical regions is described. This inexpensive facility is very strong and assures a total protection against weather inclemencies and provides security against robbery.

2. Criteria for a proper tropical window are examined. In order to obtain fresh air and evacuate warm air, the openings should have the maximum possible height and respond to the following:

a. Seal the dwelling so that no water from horizontal blasts of tornado winds nor cold air can enter.

b. Permit a total or partial aeration, arranged in such a way as to eliminate or at least limit considerably the users' closing the permanent ventilation openings.

c. Be of extremely simple execution and at the same time very robust.

d. Assure perfectly the security of the dwelling.

e. Receive a lock system on as small a scale as possible, but of great solidity.

3. Italian-type opening and the Persian window are rejected for various reasons of defficiency and high cost respectively.

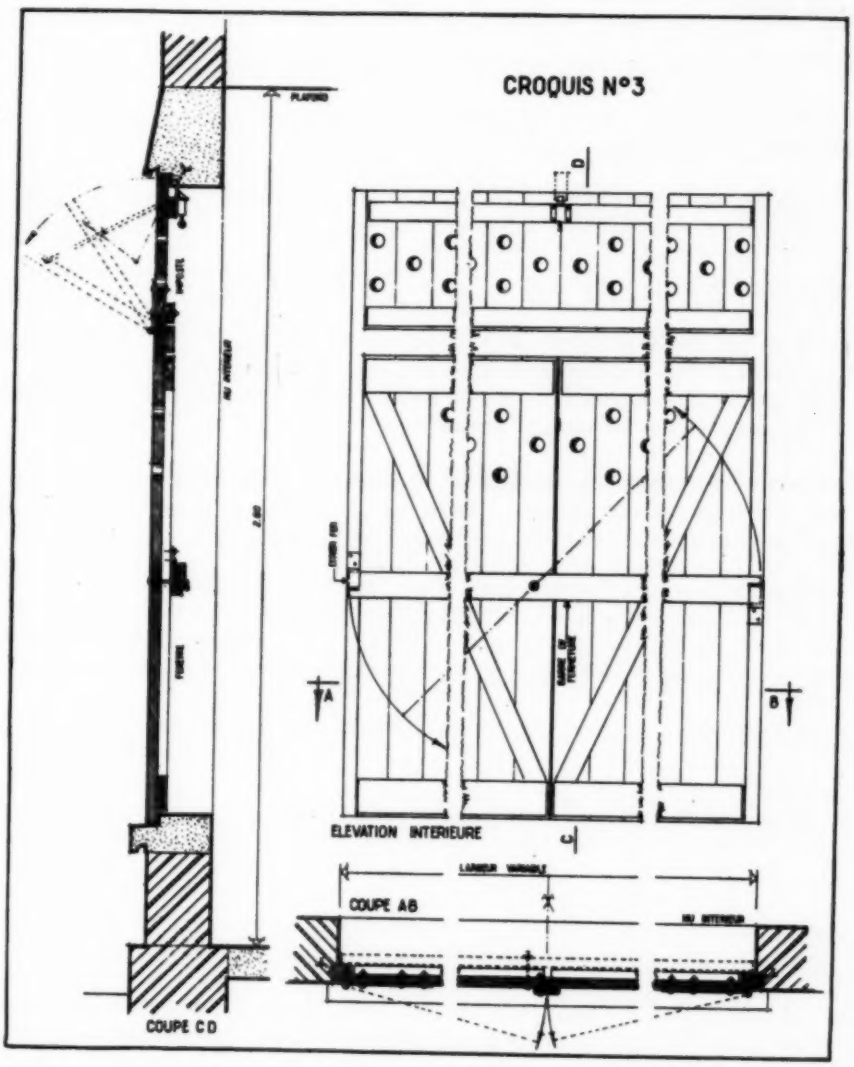
4. The type of window proposed includes:

a. A lower part with one or two shutters opening in the French way, toward the exterior.

b. A fan-light with a hinged opening toward the exterior, permitting variable aeration as wished in the upper part of the dwelling. This may be left open without risk even in the absence of inhabitants.

5. A complete framing of the window is not forseen, but only two posts strongly sealed in the uprights and fixed to the fan-light traverse. Complete framing is possible, but the lower resting beam requires a great deal of labor and might quickly deteriorate. Simple grooves are therefore made in the support posts and the lintels--the resistant elements--are made in concrete.

6. The support posts are necessary for a good fixing of the hinges: a direct seal with the masonry is never durable. The lower shutters, like the fan-light are made of strong boards (27 mm. thick), nailed and braced, and fastened by coach-screws on their interior face. Holes are made in the upper part for aeration. The closing of the lower shutters is accomplished by a strong, pivoting bar-bolt passing through the shutters and resting inside against the posts. Two strong strap-bolts in inverted position hold the bar horizontal.


CROQUIS N°3
PLAFOND
2.60
ELEVATION INTERIEURE
COUPE AB
COUPE CD

Bureau Central d'Etudes pour les Equipements d'Outre-Mer. La fenêtre dans le logement économique en climat tropical. -2

7. Strong hinges bolted onto the shutters and screwed in the grooves of the support posts and of the traverse provide for the opening of shutters and fan-light. This makes dismounting from the exterior impossible. The fan-light is held closed by a strong pump-catch, hand operated from the inside by a pull-cord. Security calipers do not permit the complete fold-back of the fan-light on the shutters below.

8. The exterior opening is prefered for three reasons:

a. The grooves in the support posts and traverse easier to make upon the same face and of the same size.

b. The opening to the outside makes it difficult for a man to enter and therefore allow for aeration even during the absence of the residents.

c. Hand-operation is easy and a latch is not needed.

9. The principle of this window is judged to be entirely valid for desert climates, except that the number and dimensions of openings would have to be reduced and the holes for aeration would have to be eliminated. Some reduction may be necessary even in other areas.

10. Economies over the Persian window will not be considerable, but in large scale use savings would mount. This is especially true when the more than negligable aspects of interior and exterior upkeep are considered.

C.E.S.T.

Cytryn S.
SOIL CONSTRUCTION, its principles and application for Housing.
State of Israel, Ministry of Labour - Housing Division. Jerusalem, 1957
183 pages. Illustrations.
624.012.8 (56)

1. This very complete survey and discussion of the characteristics of soil as a building material, together with recommendations, was undertaken by Mr. Cytryn at the request of Israel's minister of labor. These investigations were based on soil mechanics as a new approach to earth construction in housing.

2. The first section deals with the development of soil construction methods. The properties of soil are described (to the extent information was available) with reference to their use as a construction material. The basic terms are defined, and a description of soil formations is provided. Physical properties, size and shape of particles, chemical and mineralogical composition, mechanical analysis, structure, soil moisture and soil air, the varieties of soil moisture, the states of a soil, and factors controlling the plasticity of a soil are considered. Through the study of soil classification in several countries, a set of seven soil classes with corresponding compressive strengths (kg/cm^2) and densities (kg/m^3) are arrived at. The work of Popov (U.S.S.R., 1944) is drawn upon for much of the final classification.

3. Four principal methods of soil (or earth-wall) construction are described as follows:

a. Adobe - which originates from Spanish and Moroccan roots meaning to 'mix' or 'puddle' and later came to be applied to a sun-dried brick or to a structure of that material. It is also used as a term including methods of incorporating natural soil into walls, all of which rely on puddling the soil to increase its structural strength properties.

b. Pisé - which is an abbreviation of the French term Pisé de Terre, meaning rammed earth.

c. Wattle and Daub - applies to wall construction consisting of a timber frame filled in with tree branches and plastered inside and outside with mud.

d. Cob - refers to wall construction of mud and straw laid in position in the wall without any forms or moulds.

4. Each of these types is described in detail, and the following further considerations are discussed: soil selection, preparation of soil, methods of soil stabilization, advantages of soil stabilization, determination of the amount of moisture to be added to a soil mixture, mixing, moulds for blocks, block production, principles of block wall construction, forms of rammed walls, the ramming itself, the curing of soil products, and the strength of soil products.

5. Block (adobe) and Pisé construction are compared, with the suggestion that the latter may be both cheaper and quicker. Wall thickness and related factors, plaster, whitewash, paints and other wall protectors, the influence of weather conditions on earth walling, and some points on building details are presented.

Cytryn, S. Soil Construction, its principles and application for housing -2

6. A history of the use of soil as a building material from ancient times to the present is provided. In Europe, especially, a surprising amount of construction has been of this nature.

7. As a control for experimental efforts, a survey of soil buildings in Israel built without the advice of the Department for Soil Construction was made. Selected extracts from the discussion of results follows:

> "The walls of nearly all the buildings included in the survey were built from unstabilized adobe blocks with or without the addition of straw... With regard to buildings constructed by the adobe method, it is to be noted that satisfactory results were obtained when the soil was suitable for the purpose and when the rules described... were followed. ...The damage caused to other buildings constructed by the adobe method is mainly due to the peeling off of plaster and inadequate maintenance. ...The problem of proper adhesion of external plaster to adobe walls has not yet been solved satisfactorily. It is, however, known that plaster over netting fixed to the external surface of adobe walls provides a good protection. ...It was also confirmed that damage caused by rainwater to external surfaces of unstabilized soil walls should be repaired expertly and promptly: otherwise an insignificant damage may in a short time become quite serious.
> "Apart from the damage caused by peeling off of the plaster, damage to some of the buildings was also caused by ignoring some of the important rules... An example is the damage caused to the retaining walls and at the base of the walls of the buildings...
> ... Walls built from unstabilized soil by the adobe or pisé method, with or without straw, may prove quite satisfactory, provided that the soil is suitable for the purpose and that the construction is carried out properly. In certain cases, if justified by preliminary test results, the external walls may be left unplastered, in particular when building is carried out by the pisé method. In cases when plastering is absolutely essential, care should be taken to prevent its peeling off..."

8. Two sets of experiments were carried out by the Soil Construction Dept. The first of these involved the erection of experimental building during 1953 and 1954. The second, in 1954 and 1955, involved experiments with stabilized soil blocks. From these efforts the following conclusions and recommendations are summarized:

a. Good walls can be built of properly compacted stabilized soil bricks and of stabilized rammed soil by using correct methods of work together with suitable stabilizers. Such walls may compete in quality and cost with conventional building materials.

b. It is possible to produce stabilized soil blocks with a dry compressive strength much higher than that of hollow concrete blocks and with a wet compressive strength (after 24 hours immersion in water) about the same as of hollow concrete blocks. The strength should, according to local standards, be not less than 25 kg/cm^2, but in practice this is seldom attained.

Cytryn, S. Soil Construction, its principles and application for housing -3

c. It has been proved that blocks obtained from certain stabilized soil mixes absorb moisture more slowly and to a lesser extent than lime silicate and concrete bricks available on the local market

d. The heat insulation qualities of stabilized soil walls in some respects better than those of walls constructed of the conventional materials. Stabilized soil walls built of blocks containing an admixture of wood shavings possess still better heat insulating qualities.

e. It is not possible to base a correct and exact comparison between the cost of soil and of conventional wall construction on the results obtained from the experimental building construction for several reasons. It is, however, possible to determine by the aid of the formmulae provided (see para. 8) the exact quantities of materials required per m^2 of wall; and any builder can estimate easily the amount of work necessary for the construction of a m^2 of wall, bearing in mind that it is as easy to lay stabilized soil blocks as ordinary bricks.

f. The cost per m^2 of a stabilized soil wall arrived at on the basis of the data mentioned as compared with the cost of the walls built of conventional materials does not consider the following points which are of utmost economical importance:

(1) Excavation in soil instead of quarrying of stone required for the preparation of aggregates for concrete blocks or bricks.

(2) Saving in labour and machinery required for crushing of stone in the preparation of aggregates.

(3) Saving in transport of aggregates and sand required for the production of concrete blocks or bricks, and/or saving in transport of the completed bricks or blocks.

(4) Saving in pallets for handling the blocks or bricks, because soil blocks can be taken away by hand for stacking as soon as they are extracted from the machine.

(5) Saving in fuel in the case of burnt bricks.

7. Special Appendices on "Experiments with Light Roofs on Reinforced Concrete During 1953-54" and the "Experimental Building Erected at Tel-Avid in 1955" give further detailed information. A very extensive (106 item) bibliography on soil construction, including items in most languages, is provided.

8. The formulae for reckoning the quantities of materials required per m^2 of a stabilized rammed soil wall follows:

To estimate the relations between the quantity and percentage of the various ingredients of the compacted mix the following notation is used:

g_1 . . . . unit weight of loose soil ready for mixing
g_2 . . . . unit weight of the compacted mix
g_s . . . . unit weight of stabilizer when loose

Cytryn, S. Soil Construction, its principles and application for housing -4

p_1 . . . . percent of moisture in the loose soil by its dry weight
p_2 . . . . percent of moisture to be added by weight of the dry soil
p_s . . . . percent of stabilizer by weight of the dry soil
p_{1v} . . . . percent of moisture in the loose soil by volume
p_{2v} . . . . percent of moisture to be added by volume of the loose soil
p_{sv} . . . . percent of loose stabilizer by volume of the loose soil

The weight of the loose soil prepared for mixing required per unit volume of the compacted mix will therefore be:

$$g_3 = (100+p_1)\frac{g_2}{c} \qquad (2)$$

The number of volume units of loose soil required per unit volume of the compacted mix will be from(2):

$$m=\frac{g_3}{g_1} = \frac{(100+p_1)g_2}{cg_1} = \frac{g_2}{cc_1} \qquad (4)$$

$$\text{where } c_1 = \frac{g_1}{100+p_1}$$

For a wall b metres thick $V=10^3 b$ litres of compacted soil mix will be required per m^2 of wall and $V_1=Vm$ litres of loose soil will be necessary by considering equation(4).

If the proportioning of the materials for the mix is to be carried out by weight, the weight of the soil in kg/m^2 of wall, will be, considering(4), as expressed below:

$$G_1=V_1g_1=Vmg_1=V\frac{g_1g_2}{cc_1} \qquad (12)$$

Similarly the weight of the stabilizer required per m^2 of wall will be:

$$G_s=G_1\frac{P_s}{100+p_1} \qquad (13)$$

and that of the moisture to be added:

$$G_w=G_1\frac{P_2}{100+p_1} \qquad (14)$$

If the proportioning is carried out by volume, the volume of the loose soil in litres per m^2 of wall will be, considering(4), as follows:

$$V_1=Vm=\frac{Vg_2}{cc_1} \qquad (15)$$

The volume of the stabilizer and of the water to be added will, therefore, respectively be:

$$V_s=\frac{V_1P_{sv}}{100} \qquad (16) \qquad\qquad V_w=\frac{V_1P_{2v}}{100} \qquad (17)$$

E.M.N.

United Nations, Economic Commsiion for Europe, Industry and Materials Committee, Housing Sub-Committee (prepared by Maurice B. Blackshaw).
A Comparative Study of the UTILIZATION OF SPACE in current Types of Dwellings in 14 European Countries (1948-1949), 1951
643.2(4)

1. This is an important study of space utilization in housing. Although it appeared several years ago, a recent revival in interest in the subject makes this report valuable as a reference point.

2. Following is the CIDB abstract of the study:

> "The report presents plans of dwelling types of recent construction with calculations of gross and net areas, and areas used for various purposes, based on information submitted by Governments. A comparison leads to comments and conclusions of interest to Governments, housing societies, architects, etc. Housing requirements as reflected in the plans are found to differ little. In Greece a 'nuclear' type of house is developed to meet extreme shortage. Introduction of 'study bedroom' and more open planning is proposed to improve utilization of available space. To reduce costs, it is suggested to study possibilities of omitting basements, reducing ceiling heights, grouping houses in pairs or terraces, standardizing common components, simplifying staircases and devoting particular attention to the quality of design."

3. Much of the value of the study lies in the statistical findings themselves. The tables from the several sections of the report are therefore summarized. Three basic dwelling types were studies:

Type A: a dwelling with two bedrooms contained on one floor either in the form of a flat or a bungalow.

Type B: a two storey house (whether in detached, semi-detached or terrace form) with two bedrooms.

Type C: a house similar to Type B, but with three bedrooms.

4. Gross Area, which includes the areas of all rooms, service space, circulation space and internal partitions of the dwelling, is summarized as follows:

	Type A	Type B	Type C	
Maximum:	153.7	144.0	150.0	(M^2)
Minimum:	45.6	47.2	71.7	
Average:	72.4	89.2	105.6	

The wide range, especially in Type A, is accounted for by the inclusion of basements in some countries (inflating the maximum) and the special building situation in Greece (giving a very low minimum in both Types A and B). By eliminating basement figures and the data for Greece, therefore, the following distribution is found for Type A;

Maximum:	80.4	(M^2)
Minimum:	51.6	
Average:	63.3	

United Nations, ECE... A comparative study of the Utilization of space... -2

5. Living space, defined as the total of the net areas (excluding interior partitions) of the living room, sitting room, kitchen and bedrooms, shows the following pattern:

	Type A	Type B	Type C	
Maximum:	61.8	73.9	89.4	(M^2)
Minimum:	32.3	32.0	51.8	
Average:	49.0	53.7	64.7	

The percentage of living space to gross area is as follows:

	Type A	Type B	Type C	
Maximum:	84.8	81.0	78.3	%
Minimum:	37.5	45.3	47.2	
Average:	72.9	62.6	63.3	

The space per occupant is calculated on the basis of four persons in Types A and B and five in Type C, unless otherwise indicated in dwelling plans. The per capita living space is of this order

	Type A	Type B	Type C	
Maximum:	17.9	18.5	15.7	(M^2)
Minimum:	8.1	8.0	10.4	
Average:	13.0	13.5	12.6	

6. Living rooms, defined as "a room used primarly for recreation and relaxation, and also for eating meals," have the following distribution:

	Type A	Type B	Type C	
Maximum:	22.2	23.2	31.5	(M^2)
Minimum:	13.8	11.0	11 6	
Average:	17.6	17.7	19.1	

7. Kitchens, including working kitchens only as well as those used for eating and other activities, follow this pattern:

	Type A	Type B	Type C	
Maximum:	12.3	16.1	14.1	(M^2)
Minimum:	4.5	5.2	5.2	
Average:	8.2	9.9	10.3	

8. Bedrooms for the three house types have the following areas:

	Type A		Type B		Type C			
	B.1	B.2	B.1	B.2	B.1	B.2	B.3	
Maximum:	17.8	15.3	21.0	14.7	18.0	14.2	12.6	(M^2)
Minimum:	7.8	7.7	11.8	6.7	11.1	8.1	5.2	
Average:	13.4	10.8	15.1	10.3	13.8	11.4	8.8	

United Nations, ECE... A comparative study of the Utilization of space... -3

Using the number of beds shown on plans, floor area per person in bedrooms was worked out:

	Type A	Type B	Type C	
Maximum:	8.8	9.3	8.9	(M^2)
Minimum:	5.3	5.1	5.6	
Average:	6.4	6.3	6.6	

9. Service space, defined as the total of the net areas of bathroom, w.c., utility room, washouse and stores, showed the following percentage of gross area:

	Type A	Type B	Type C	
Maximum:	43.9	30.9	35.4	%
Minimum:	3.6	1.9	4.1	
Average:	11.4	14.8	14.3	

The great dissimilarity in the proportion of service space provided in dwelling is again partly the function of large basements--which are necessary where wood is the fuel for heating in long winters.

10. Circulation space, the total of the net areas of the hall, lobby, corridors and landing, including the staircase area where it is for the sole use of the household, shows the following percentages of the gross area:

	Type A	Type B	Type C	
Maximum:	15.0	25.5	21.7	%
Minimum:	5.2	10.4	9.8	
Average:	11.1	17.9	18.1	

11 Conclusions on the various means to improve utilization of space and to cut costs are taken in some detail. Problems of heating, thermal insulation and sound-insulation between rooms are considered. The potential of standardising certain articles in common use is brought out.

12. Appendices provide the sample plans from the fourteen nations: Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Norway, Poland, Sweden, Switzerland and the United Kingdom (separate for England, North Ireland and Scotland). Statistics are compiled individually by country.

B.D.E.N.T.

Union Internationale des Organismes Familiaux, Commission du Logement Familial
SURFACES MINIMA D'HABITATION, Progressivité du Coût et des dimensions du logement en fonction des dimensions de la famille.
Cologne 1957. 31 pages. (Charts) (Text in French)
333.332.6 (100)

1. This study concerns the minimal housing needs of different types of families. Progression of cost and dwelling dimensions are considered as functions of the family size and structure. Results of studies by Dr. Ing. W. Triebel (Institut für Bauforschung, Hanover) are given. A series of resolutions for further work, which were subscribed to also by International Federation of Housing and Town Planning, are provided. The Commision du Logement de l'Union Internationale des Organismes Familiaux, together with the "Loyer et Revenue Familial" study group of the Internatinal Federation of Housing and Town Planning, studies the different aspects of the problem. Terms of position on the problem are given as follows:

> "Si l'on voulait, en une formule brève et synthétique, exprimer l'essentiel de toute politique familiale de l'habitat, on pourrait dire qu'elle doit tendre à adapter le logement, du triple point de vue spatial, fonctionnel et psychologique, aux besoins physique, spirituels et affectifs de la famille, compte tenu de sa structure et de ses dimensions."

2. The study of economic problems was traced through a program of the following three parts:

a. Study of the progressivity of dimensions and of construction cost of a dwelling as a function of family dimensions. Determination of augmentation of these structural dimensions and of the cost for supplementary unity of the total family strength. The conclusions of this study must lead to the establishment of a curve indicating the cost of dwelling -- which may differ according to region and country. Such a study ought to permit the expression of sufficient approximation showing what should be, for a family of known dimensions, the index or the normal rent price--for comparison with the normal rent of a minimum household, composed for example of two persons.

b. Study of a problem posed as: The cost of the dwelling or its rent being known for each type of family, the study of the relation between this post of family budget and the standard of living of each family: what percentage will represent the charge for housing in relation to the expenses and total resources of the family, and to what measure can it reasonably be integrated into its budget? This study permits calculation for each family the fraction of rent which exceeds its normal financial capacity.

c. Knowing the exact value of this new data--in other words considering the measure of the contribution to be made up by the collectivity so that the family can face the normal tenant's charge for a dwelling suitable to its needs--the study of ways and means remains. This is the third problem, that of financing by Public Powers or with their aid.

3. The 'spatial imperative' is the basis of these studies. It is well known that in a large proportion of cases families are not housed to their need. One can almost generalize that in all countries the nature of housing worsens as the number of members in the family increases. Overcrowding of housing, according to facts furnished by numerous social studies, is essentially a family problem--and especially a problem of large families.

4. This imbalance in the qualitative structure of construction--which is very different from the quantitative poverty of housing which continues in several countries--is imputable because of the fact that the series of habitations put at the disposition of populations is not sufficiently diversified. Construction efforts tend to produce great quantities of two or three types of medium-size dwellings. A variety of dwellings of different sizes is called for the occupancy as well as sufficiency of number, satisfying quality and economic price.

5. How is the occupancy-capacity of a dwelling to be measured? Two methods for consideration are:

a. The constructed surface.
b. The number of rooms.

The first of these requires exacting and detailed study and the collaboration of qualified technicians. The second is too indefinite because the word 'room' can cover spaces of different dimensions and of different functions.

6. To remedy such problems the U.I.O.F. adopted a formula based on simplicity and called an 'Indice de capacité familiale d'occupation.' Among the more or less imperative desiderata to be satisfied in order for a habitation to deserve being called 'rational' is the sleeping space. Parting therefrom, the Commission considered that the element most essential to the capacity of a dwelling is the space reserved for the night; and two fundamental necessary criteria were examined to characterize the capacity:

a. The number of bedrooms in the dwelling.
b. The total number of persons these bedrooms can normally receive.

This 'index of capacity' is not a technical norm, but an 'etiquette,' helping to classify a dwelling according to its capacity. It is a clear notation, generally understandable and easily used through the juxtaposition of two numbers: the number of bedrooms/the number of people. (For example the index '2/3' indicates a dwelling with two bedrooms and three residents, the index '5/9' similarly indicates five bedrooms for nine persons total.) Of course each dwelling so classified must be studied also by technicians and sociologists to determine the optimum standards of dimensions for each capacity. It is important to notice that the same index of capacity can cover dwellings of perceptibly different norms, and the index can apply to ranges of homogeneous dwellings. Each series should be considered separately and the index completed with a letter characterizing the series: for example A for apartments, R for rural habitations and M for single-family houses.

7. The theme of the discussion during the Cologne Session (April, 1957) was the analysis for each configuration of habitation range the minimum space required by each family function. From this was derived the progression of overall minimal dwelling surfaces as a function of family dimensions, expressed in a schematic synthesis.

8. Rapporteurs for the study were J.Boreret-Mali (Belgium), B.Frommes (Luxemburg), and C.Schweyer (West Germany) in collaboration with Dr. Ing. W.Triebel (Institut fur Bauforshung, Hanover). The limited range of the study of surfaces allowed the conclusions to be presented only in the form of a schematic table, numbered with capacity progressions. In this way fortuitous factors are eliminated from the final cost, and other factors (such as the number of storys, number of apartments on a story, etc.) are brought back to a common denominator. Data below follows from Dr. Triebel's studies: (All data makes use of a starting-point index of 100.)

9. These factors play an important part in the cost as follows:

a. Number of rooms

	Cost per m^2 of habitable surface	
	for 60 m^2	for 70 m^2
Dwelling of 3 rooms plus kitchen and bathroom	100	93
Dwellings of 4 rooms plus kitchen and bathroom	104	96

These figures indicate that for a dwelling of the same area, the number of rooms plays a certain role relative to the lowering of cost.

b. Habitable surface (number of rooms constant)

Cost per m^2 of habitable surface

For 50 m^2 100
For 60 m^2 91
For 70 m^2 84

These figures are said to indicate that the areas of rooms ought to respond uniformly to a pre-established program.

c. Depth of the construction
Relations drawn up on the basis of a 3-story house with two apartments per floor; constant number of rooms and habitable surface)

Depth in Metres	7.76	8.33	9.15	10.00	11.00	12.97
Cost per m^2 of habitable surface	100.00	96.60	96.80	94.90	94.50	94.20

It is noted that up to 10 metres of depth the cost lowers rapidly, but much more slowly between 10 and 13. Findings are thought to indicate that all base plans should be established on the same construction depth, and also that a depth of ten to thirteen metres is most economic.

d. Number of storys: Cost variations according to the number of storys differ somewhat by construction methods. Four systems were studies and the digression of cost per apartment varied--in a study involving buildings of two to five floors--from the maximum indes of 100 to between 82,6 and 91,4. It was possible to establish the following averages:

Union Internationale des Organismes Familiaux... Surfaces minima d'habitation... - 4

Number of floors	Price per m^2 of habitable surface
2	100
3	90.3
4	86.0
5	84.0

Land costs-which of course will vary from country--can have a strong effect on the curve of cost decrease. In the experiment used, the following figures resulted when land costs were included.

Price per m^2 of habitable surface, including therein land costs streets and connections

(Number of Floors)	(Cost Index)
2	100
3	88
4	83
5	82

The necessity of having the study embrace all such costs is emphasized.

e. Number of dwellings per story (per stairway)

(Number of Dwellings)	(Cost Index)
1	100
2	90
3	86.4
4	85.6

A complementary study showed that the relation held generally no matter what number of storys.

10. Information on actual minimum area accepted in various countries is far from complete; but some such data is outlined. Specifically, information is provided on Germany, France, Holland and the United States.

11. Resolutions made at the Cologne conference concerned:

a. Adoption of the progression of minimum surfaces of housing and recommendation to public officials that the standards be reserved.

b. Continuance of the study of cost and dimension progressivity in housing as a function of family size.

Two 'pilot plans' (one for a single family house and one in an apartment pattern) elaborating for each range a complete series of the nine considered indices of capacity between 2/3 and 5/8. The plans thus developed will be submitted to different national delegations for study and comparison with their own national conception of minimal dwelling area needs.

C.D.E.K.U

Medinacely, Victor Montoya.
IMPROVING RURAL HOUSING THROUGH COMMUNITY CONTESTS IN BOLIVIA
Americas, 9; 12, December, 1957. pp. 16-18. Illustrations.
333.332.2 (84)

1. This is a discussion of the successes achieved through a community improvement contest in Coipasi, a Quechua Indian village in the Bolivian province of Cornelio Saavedra de Potosi. Mr. Medinacely is a specialist in fundamental education and in charge of publications for the cooperative Bolivian-American educational service known as SCIDE from its initials in Spanish.

2. Traditional housing in this village has had only low, narrow doors scarcely big enough to let an adult through, no windows, and blackened interios (from soot) as well as leaky roofs. Most of the houses were far below standard, and some families were living in almost subhuman conditions. This was explained more by lack of any encouragement to improve living conditions than by poverty itself. Ancient habits made the people indifferent to change from living in unhealthy crowding of their mud huts. And the influence of the local school was neutralized by the attitude of elders.

3. The Coipasi Fundamental Education Project (composed of teachers, doctors and others) went as a social-work team to visit rural dwellings and become acquainted with heads of households and other inhabitants of the region. The fortunate idea of launching a home-improvement contest provided a useful stimulus. Where earlier it had seemed that the Project workers were alone in their efforts in the community, the rural population soon began to back up their plans. Some thirty households (82% of the community) have taken part in the program during the past three years. In addition such new goals for the community as laying out narrow streets, rearranging the central plaza, rebuilding the church, completing the Social Center for Adults, establishing sports fields, and repairing and enlarging the village school have been undertaken.

4. The judging for the 'Concurso de casas Mejoradas' contest concerned the improvement of roofs, provision of windows, (the most popular innovation) the installation of simple raised stove (rather than the traditional floor cooking fire), the size and number of rooms (with special attention paid to separate kitchens, sleeping quarters and corrals). Windows were bought through a consumers' cooperative, and villagers caught onto them through a spirit of imitation. Due to the rural dwellers' suspicion, however, the size of these windows remained small. Cooking practices were more easily changed among young married couples, and some of the older folk continued to cook on the floor even if they had new stoves.

5. The success of this project has inspired other work of a similar nature elsewhere. The community of Warisata, an Aymara Indian community on the Andean plateau, was the site of one such project. In this case the Warisata Rural Normal School incorporated the work as part of its teacher training program. Porco, a very old mining center of Spanish days, was the village showing the most interest in the improvement of homes.

Windows, one of most popular innovations, were cut through adobe walls. Below: the finished product

Cooking fires on floor have given way to simple raised stoves. Model kitchen below is in Social Center for Adults

E.N.S.

United Nations, Economic Commission for Europe and Food and Agriculture Organization
TRENDS IN UTILIZATION OF WOOD AND ITS PRODUCTS IN HOUSING
Geneva, 1957.
624.011.1 (100)

1. This is the report resulting from a study prepared jointly by the secretariats of the Food and Agriculture Organization of the United Nations and the United Nations Economic Commission for Europe. It deals with the limited field of trends in utilization of wood and its products in new residential construction. This report, in its provisional form was presented to the Timber Committee in October, 1956; and after consultation with member governments, it was thoroughly revised for publication in its present form.

2. Changes in size, design and methods of construction have been witnessed in recent years. With relation to sheer numbers:

> "Dwelling construction has risen steadily, both in absolute terms and in relation to the population. Dwellings completed per thousand inhabitants reached 5.8 in 1954 for Europe as a whole and rose to 6.2 in 1955 and 6.3 in 1956. Until 1954 the increase was fairly general. From 1955, a downward trend has been evident in certain countries (Denmark, Norway and United Kingdom). This has been more than offset by increases in France, Italy, Greece, Spain and in some eastern European countries, notably Czechoslovakia and the USSR.
>
> "Current plans provide for a considerable expansion of house-building activity in eastern Europe in the coming years, while a further expansion is expected in certain western European countries--e.g., France, the Netherlands and Spain. Data on authorizations or dwellings under construction suggest a reduction in Norway, Switzerland, the United Kingdom and western Germany."

3. Social factors influencing the dwelling unit include shifts in population patterns which have, so far at least, called for smaller houses. This may be temporary, however, for there is some evidence that the decline in family size since the turn of the century may have been checked because:

> In the decade since the war, Europe has, on the whole, experienced a period of economic growth and prosperity; resulting either from consciously pursued full employment policies or more far-reaching economic planning, which contrasts favourably with any previous twentieth-century decade.

Another population factor is the continued movement to the city for increased industrial employment. This has meant that less wood proportionately has gone into dwellings, for it is found that rural houses are generally more often all wood or mainly wood. Government activity in the housing field has brought about rationalization, including diversification for need rather than demand. A trend toward multi-family dwellings in several countries is noted, and a connection is seem to increased urban construction:

> Taking Europe as a whole, but excluding the USSR, it seems likely that somewhere between 70% and 75% of all new dwelling units built today are erected in urban areas... This compares with a percentage urban population of round about 50. If the USSR is included, then about 66% of new dwellings are being built in urban areas, against a percentage urban population of about 45.

United Nations, ECE & FAO. Trends in utilization of wood and its products in housing - 2

> "... in recent years nearly half of all new dwelling units built in Europe have been erected in multi-family constructions. Unfortunately, pre-war statistics on this point are lacking, but the general impression is that before the war the proportion was nearer one in five."

Evidence indicates that multi-family construction requires less, often much less, wood. Further investigation of this is presented in the principal end uses of sawnwood for housing in USA, Greece and Sweden. Structural elements appear to be the major use, a general decline is seen in floorwork, and while wood is especially important for walls in Sweden, it also showed the greatest decline in that country.

4. The all-wood house as such was examined and the following conclusions were reached:

> "In Europe as a whole, the proportion of new dwellings built entirely of wood is declining and will continue to decline, in consequence of economic and technical trends... Careful attention to design and wood-saving possibilities has considerably reduced sawnwood consumption even in the all-wood house, and in some instances these developments have succeeded in keeping wood competitive. The effect of these developments has been to free for other uses a substantial quantity of sawnwood. A major factor in the evolution of the wooden house in the last decade has been the possibility of substituting other wood products, notably hardboard for sawnwood.
>
> Pre-fabrication has let to the creation of a new and important market for sawnwood, but high duties and heavy insurance and transport costs tax the competitive power of the pre-fabricated house in most export markets and are thus likely to limit the expansion of the industry. The most hopeful prospects of further development, in the light of recent US experience, would seem to be in the direction of a fuller realization of the possibilities of combining sawnwood with plywood, hardboard and particle-board in new pre-fabrication systems."

5. Although there has been considerable decline in sawnwood consumption per dwelling since the war, there indications that the trend will not continue so sharply. Wooden houses will survive only locally. The greatest general area of consumption decline is in structural elements. In joinery and in formwork and scaffolding little or no decrease has been seen, but as methods change with technology these fields may be expected to decrease.

6. It was estimated in 1950 that from 12 to 15 million cubic meters of wood would be needed by 1960 for residential construction. The figure has already been passed. This was due to an error in estimating the consumption per dwelling unit and also to the fact that European residential construction has exceeded expectation. While wood consumption has increased, it has not done so as fast as building activity. It is therefore felt that the total consumption (25% of which goes to housing) will not increase unless there is a greater than expected building boom.

D.E.N.T.

Webb, C.G.
NATURAL VENTILATION IN LOW_LATITUDE BUILDINGS.
Journal of the Royal Institute of British Architects. 65:1, November, 1957.
pp. 10-12. (Diagram and table)
697.9(213)

1. A ventilation index designed for application in climates such as those of Malaya, Indonesia, New Guinea, the West and East Coasts of Africa and the Amazon basin, with possible extensions at certain times of year to places such as the North Coast of Australia, Ceylon, India and Central America. The paper is part of the programme of the Colonial Liaison Section of the Building Research Station of the Department of Scientific and Industrial Research.

2. In the 'doldrums' climate the ventilation process has certain characteristics which make standards developed in temperate climates unacceptable. In the vicinity of the Equator there is a permanent ring of low barometric called the Equatorial trough, toward which the trade winds from both hemispheres converge. At the centre of this "winds are light, especially at night. The atmosphere is warm; the amoung of cloud is considerable, precipitation is rather heavy, and the air is humid. There is fairly intense heat radiation from the ground and sky. Storms are of only moderate intensity brief and local. The climate as a whole is equable, the principle variations being the daily heating by the sun and the nocturnal cooling."

3. Although traditional Equatorial dwellings is of a relatively flimsy structure and open design and unheated, the ambient temperature tends to be higher indoors because of the penetration of solar radiation and of the metabolic heat of the occupants. Other variables need to be investigated. The comfort zone for the acclimatised population expressed in effective temperature (taking into account air movement and humidity as well as actual air temperature) is between 75 and 80 degrees F.

4. The following principles of low-latitude ventilation are stated:

a. "The air temperature tends to rise in occupied buildings, and as the ambient temperature is above the comfort zone by day it is necessary to limit the rise to a small, and if possible to a negligible, value. At night the ambient temperature is lower, and a rise of about 5°F is often found desirable to comfort.

b. The amount of fresh air required to keep an occupied house cool is often very large, and more than sufficient to keep ordinary odors and even cigarette smoke at an unobjectionable level. In the absence of any special source of air contamination the indoor air temperature is therefore the operative criterior of the adequacy of low-latitude ventilation.

c. Wild heat, i.e. heat from cooking fires, heat transmitted through the roof and walls or released from storage in them, insolation through doors and windows, etc., increases the requirement of fresh air. Storage of heat in the structure can at times reduce it. Through the operation of the daily temperature cycle, ventilation problems tend to be less serious in the mornings and less serious in the evenings.

d. Owing to the lightness of the wind in the evening and at night, the natural ventilation of occupied buildings is then carried on almost entirely by the stack effect; that is to say, the driving force drawing fresh air into the building is the excess buoyancy of the warmed and vitiated air already inside.

e. In crowded buildings the main source of heat is the metabolism of the occupants."

5. Following from the above principles it is "appropriate to design the openings of low-latitude buildings on the basis of stack effect ventilation driven by metabolic heat, with a correction for non-metabolic heat whenever the effect is appreciable." The use of a ventilation index based on the calculated rise of the indoor air is suggested to facilitate the process of design and to estimate the efficacy of the natural ventilation in any actual or proposed building.

6. "It can be shown that the air temperature rise ΔT is given in degrees Fahrenheit by the equation

$$(\Delta T)^3 = 0.045\ (400p + X)^2/A^2h$$

where p is the number of persons present, assumed to be at rest and producing heat at the rate of 400 B.t.u./hour each;
X is the aggregate rate of production, in B.t.u./hour, of all other heat in the room under construction;
A is the total area of the openings to the outside in square feet;
h is the height of the ceiling, or the top of the highest opening, whichever is the less in feet." This temperature rise itself could be used as an index of effective ventilation, but it is thought that the Index E will be more convenient where:

$$E = 7.72\text{-}6 \log \Delta T$$

"The numerical term has been chosen for arithmetical convenience, and the coefficient of $\log \Delta T$ is designed to provide a suitably open ventilation scale." Values of Index E usually lie between 0 and 10 which provides a workable range. Higher values indicate smaller temperature rises and better ventilation. Rates of air change are not worked out since they depend on the space available per person; but they may be worked out for any given case and are of a "higher order of magnitude" than are found in temperature climated.

7. In the use of the Index there is the implicit assumption that ventilation openings are set for stack ventilation--that half the available area for openings are close to the ceiling and the others near the floor. A major departure may reduce the effective area of opening or ceiling height. Up to X/p = 100 B.t.u. per person per hour positive wild heat affects the Index very little and can usually be ignored. Similar amounts of negative wild heat, (whether from refrigeration, evaporation of wall moisture, or heat storage in the building structure) greatly improve the ventilation condition however. But these negative wild heat producers tend to operate only in the mornings.

> "The present consideration of the matteris confined to cases where the wild heat is fairly small in amount and is positive; and the index applies to the open, not air-conditioned, accommodation in the afternoons, evenings, and at night, under ordinary, not overcrowded conditions of continuous occupation."

Large amounts of wild heat may occur in badly designed kitchens and in factories, but it is not thought that X/p will often exceed 1 Kw per person.

Webb, C.G. Natural Ventilation in Low-Latitude Buildings -3

8. A graphic method of determining the ventilation Index E is also outlined and an example is provided. A derived Index E of 4.7 leads to the following evaluation:

> "Ventilation in this case will in the absence of wind, be no more than adequate. The indoor air will be 3° warmer than the outside and by day the use of fans would be necessary. By night the ventilation would be ample without fans. The supply of fresh air t through the operation of the stack effect is more than ten times that specified in European codes of practice, and the possibility of odours, etc. becoming objectionable need not be considered in ordinary circumstances.

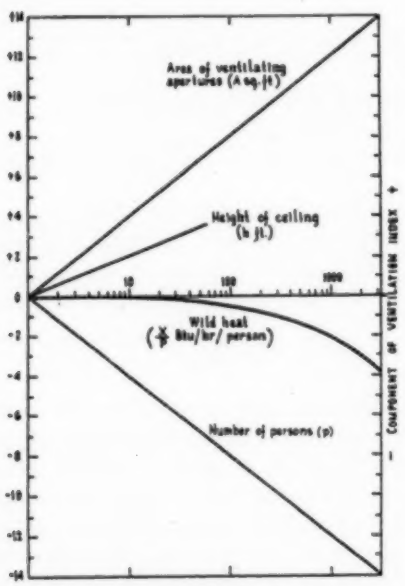


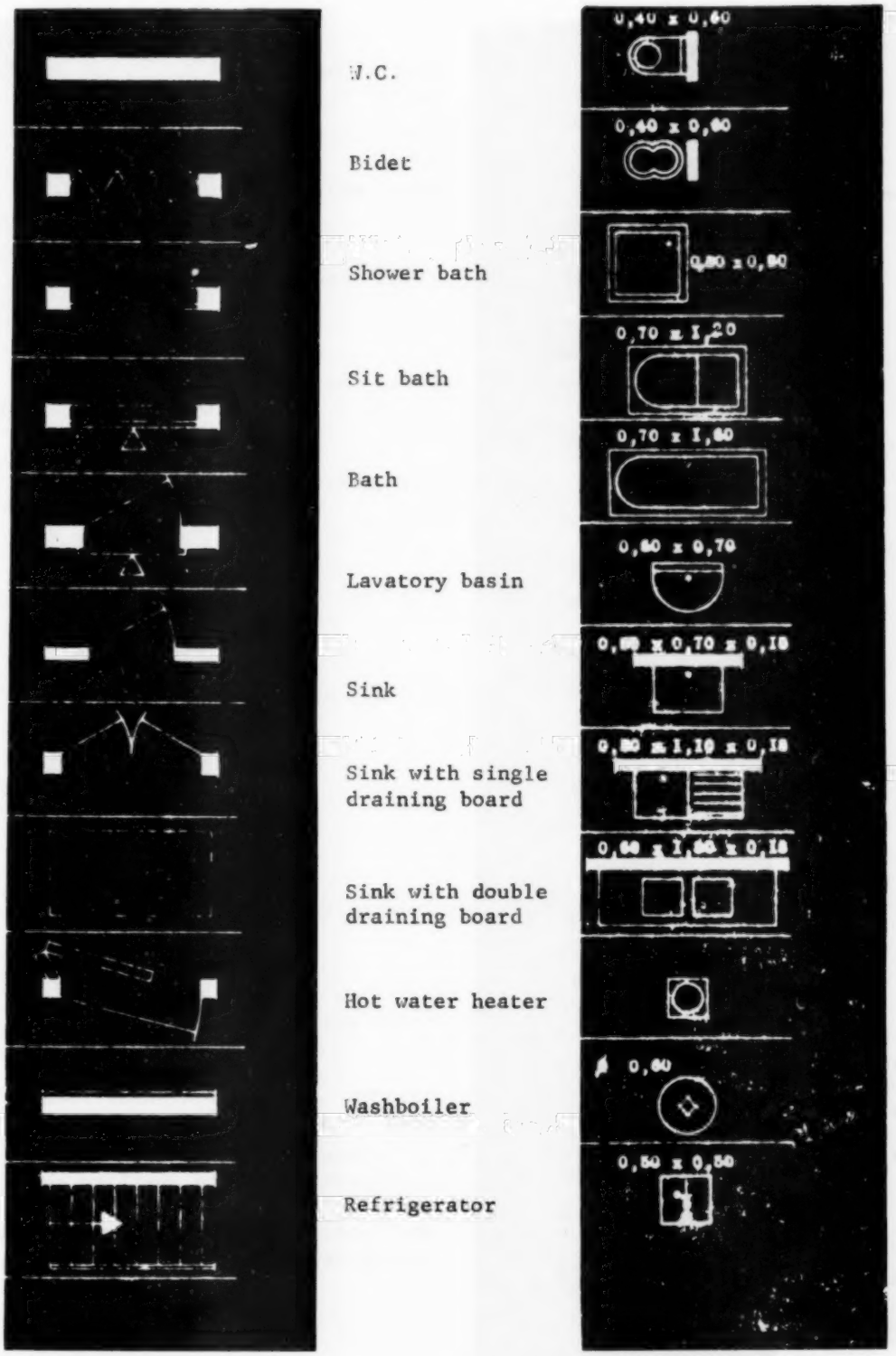
FIG. 4. GRAPHICAL DETERMINATION OF VENTILATION INDEX E
(The four quantities A, h, p and ½ are measured on the common horizontal logarithmic scale.)

Ventilation Index *E*	Rise of temperature ΔT, in °F	Fresh air supply cu.ft./hr./person ($X = 0$)	Comment
10	0·4	54,000	Excellent, cool
9	0·6	37,000	
8	0·9	25,000	Very good
7	1·3	17,000	
6	1·9	12,000	Good
5	2·8	8,000	
4	4·2	5,500	Adequate
3	6·1	3,700	
2	8·9	2,500	Uncomfortable
1	13·2	1,700	
0	19·3	1,200	Dangerous

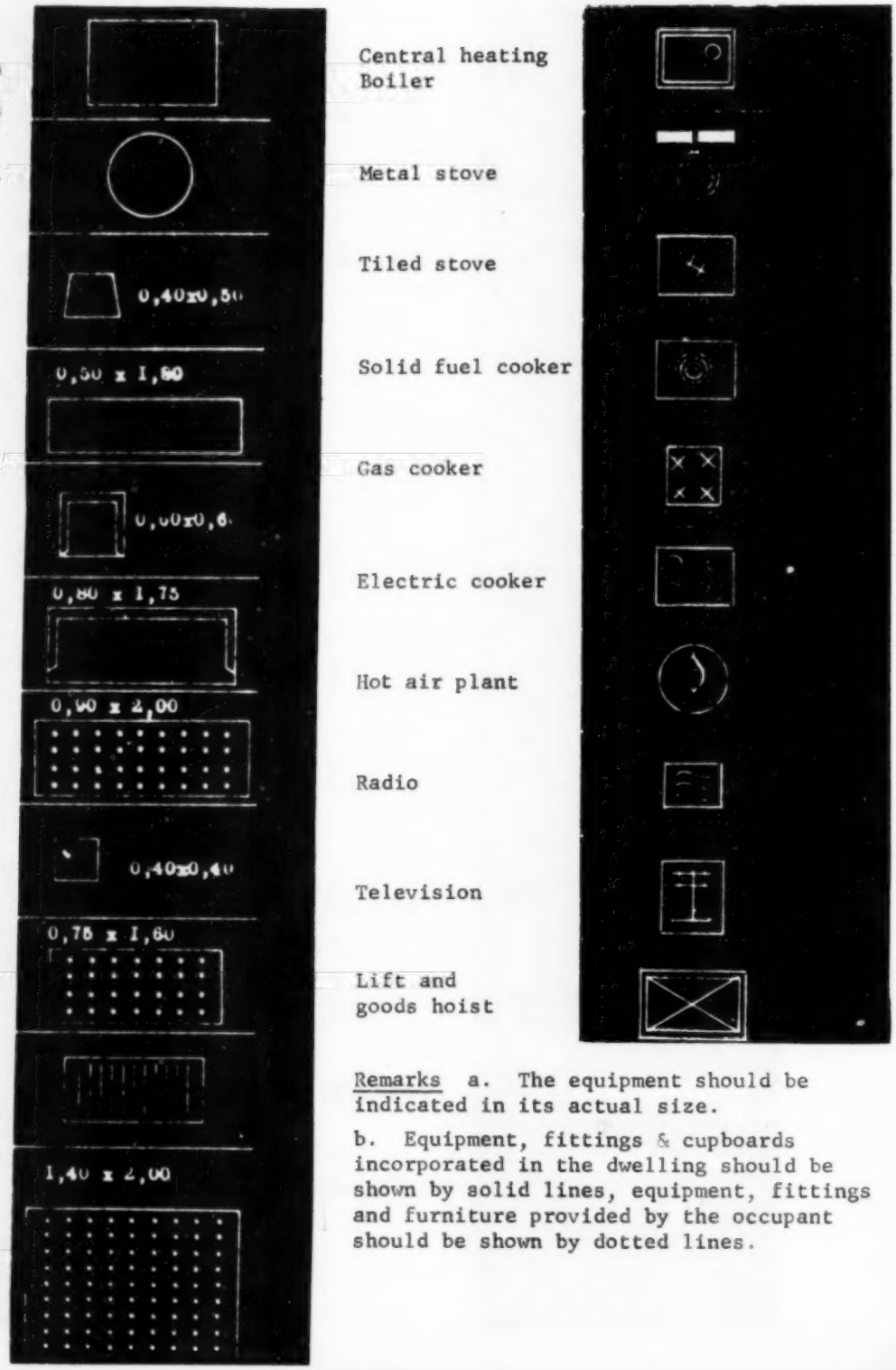
B.E.T.

CONVENTIONAL SYMBOLS used by the Housing Committee of Economie for Europe of the United Nations.

CONVENTIONAL SYMBOLS FOR REPRESENTING FURNITURE AND EQUIPMENT



Conventional symbols - 2



Remarks a. The equipment should be indicated in its actual size.

b. Equipment, fittings & cupboards incorporated in the dwelling should be shown by solid lines, equipment, fittings and furniture provided by the occupant should be shown by dotted lines.

PLANNING

C.E.F.I.O.S.T.

Coughlin, William J.
THE INSIDE STORY ON SOVIET CONSTRUCTION
Engineering News-Record, December 26. 1957. pp. 26-29. Illustrations.
69 (47)

1. This is a report on construction activity in Russia, by Mr. Coughlin, Chief of the London Bureau, Mc-Graw-Hill World News. The writer was one of the first Americans (four journalists) allowed to drive their cars into Russia as tourists.

2. It is emphasized that Russian construction is a strange blend of modern effort with antequated design. Many achievements are indeed impressive, but many others are quite poor. Yet the amount of Russian construction is considerable: An entire new district covering 25 blocks, providing a total of more than 21 million square feet of living space is under construction between Vnukovo Airport and the southern edge of Moscow. Preliminary work for a double-deck bridge which will connect this new suburb with the rest of the city is under way. Recently constructed blocks of flats and many more under construction are to be seen throughout the city.

3. The intense housing activity is partly connected to conditions in Moscow's overcrowded slums. The plans are indeed vast: "By 1960, Moscow's living space is to increase by over 120 million sq. ft., or another 4,000 apartment houses. Construction already has started on 1,500 of these. It is reported that housing with a floor space of more than 14.6 million sq ft was erected in the first ten months of 1957."

4. The housing activity projected is to have a fundamental impact on the pattern of the city. "Moscow at present covers 138 sq mi. Ten to fifteen years from now, it is to cover 232 sq mi. There are plans for satelite towns about 30 miles outside the capital, for new subway lines and a 65 mile ring road. Buildings planned or under construction include hotels, department stores, theaters and cinemas. In the next three years, 162 schools are to be erected in the capital."

5. Reconstruction activity takes place in cities such as Smolensk, indicating the enormous burden the war placed on Russia. Built on a hill near the Dnieper River, this historic city has a charm combined with its vigor of rebuilding. A fronteer spirit runs through this activity, but Smolensk still has a long job of reccnstruction.

6. Prefabrication is the theme of a Moscow building exhibition. The emphasis is on the use of prefabricated concrete sections for homes and apartment buildings as an approach toward meeting the housing shortage.

> "A sample two story apartment house on display has no framework. Its floor is made up of lightweight flooring units between interior walls and heavier flooring units between structural walls. The wall units are holed for ventilation piping and incinerator chutes. There are integral heating panels with glass piping embedded in the concrete to carry hot water heat. Prefabricated plumbing units are provided for kitchens and bathrooms. This design can be erected as high as five storys, it's said. ...a two-bedroom concrete house costs 40,000 rubles. That's $4,000 at a fairly realistic exchange rate of 10-1. But it represents considerably more in relation to the buying power of the average Russian worker."

Coughlin, William J. The inside story on Soviet construction.

> "Other prefab concrete units displayed include a huge ten-section tunnel unit for subway construction and a reinforced concrete roof truss almost 100 ft in length, made up of five individual 20 ft sections bolted together. Production of prefabricated concrete units in the Soviet Union has expanded from 125,000 cu yd in 1956 to 260,000 in 1957, according to the latest Russian figures."

7. Not all Soviet construction utilizes concrete. Yet mechanization of building is always emphasized.

> "In the remoter areas of the Soviet Union--the so-called "virgin lands" of Siberia--natural materials are being used in construction of new towns for the settlers. Immense quantities of reeds grow in these areas, and the Russians have developed a machine for binding and cutting them into usable wall panels. These are wired to a brick exterior and then covered with plaster on the interior side for a three-ply insulated wall supported by a wood frame."

8. Other types of construction are being completed or are beginning on the rivers. One such effort is the 2,3000 ft Kuibyshev hydroelectric station build across the Volga with 2.1 million Kw. capacity from twenty units. Another is Bratsk station on the Angara and Yenisei Rivers in Siberia, which will top both Kuibyshev and the Stalingrad station, still under construction. The atomic power program calls for building huge power stations generating up to as much as 2.5 kw, and construction on one has started. Since 1917 more than 32,000 large factories have been erected, 69,000 miles of new railway lines. A third trans-Siberian railway is under construction.

9. Traffic is light on Russian roads, and this has relieved planners from any need for modern freeways. As a result highways are far below the West European standard. Since inter-city travel is mainly trucks and buses, the poorly laid road surfaces are frequently undulating and cracked at the edges. No shoulders are provided. Both asphalt and concrete are used, but prefabricated road slabs are seen only at exhibitions. In some places fill is used to support the highway across marshland, and prestressed concrete bridges are used to cross narrow rivers and to support overpasses for side roads. The using of one side of a highway for drying grain or hay and the unrestricted crossing by farm animals is described.

A.C.D.M.N.O.U.

Netschert, B.C. and Schurr, S.H.
ATOMIC ENERGY APPLICATIONS WITH REFERENCE TO UNDERDEVELOPED COUNTRIES
(for Resources for the Future) Baltimere: Johns Hopkins Press, 1957.
129 pages.
539.1 (100)

1. This preliminary study of what may be involved in the application of various sorts of atomic energy benefits to underdeveloped countries was undertaken at the request of the Ford Foundation. Both authors are on the staff of Resources for the Future. The survey deals with developments through early 1957.

2. The first section of the survey deals with an outline of the wide range of potential applications of atomic energy. First considered are the application involving nuclear reactors, including the following: Electric power generation (both small and large plants), heat, propulsion (marine, aircraft, locomotive, automobiles and trucks), radiation, medical use, the multipurpose research reactor, and isotope production. Applications involving radioisotopes fission products and spent fuel elements are next considered. Agricultural applications include food preservation, blight and pest control, genetics, and physiological and other research. Other generalized research possibilities are discussed. Despite all these potentials of applying atomic energy in under-developed areas, however, the authors sound a word of caution:

> "Almost all the forseeable applications... will require much time for research and development before they can be used economically. Therefore, any country wishing to embark on a program for the development and use of nuclear energy is faced with a multiplicity of choices, including the selection of the particular applications which make sense within that country, the timing of the steps to be taken to make these applications feasible, and the scheduling of the different things required for achieving the desired atomic capabilities. Charting a course in the face of such complexity requires much hard study. Such study would be needed even if atomic energy were not cloaked in mystery and glamour; the latter set of circumstances makes the need even more urgent if serious mistakes are to be avoided. It may well be that in the end the more dramatic and spectacular peaceful atomic energy applications will not be the most important."

3. The second section of the study involves the conditions necessary for using nuclear energy. For the provision of heat and power: the provision of reactors, investment costs, facilities and materials necessary and manpower required are discussed. (Skilled workmen may prove more difficult to obtain than technicians and engineers, who can be provided by European countries on a short term basis.) Other conditions must be met for any realization of benefits, and further serious study is needed on the demand for heat and power, the supply of alternative resources, projections of the future energy picture. Also detailed information is needed on isolation (relative to transportation), particular lines of the industrial development and water problems as affected by energy availability. Such information must be gathered for each country in which nuclear power would be significant. Similar considerations apply to propulsion, in terms of the provision of reactors and the realization of benefits.

Netschert, B.C. and Schurr, S.H. Atomic energy applications to underdeveloped countries -2

4. For the discussion of the other applications of Atomic energy the radioisotope or 'non-reactor' elements are considered. Two categories of these are distinguished, the inexpensive "tracer" uses and the more expensive "non-tracer" uses. For industrial applications it is felt that "under most circumstances there seems to be no real need for an underdeveloped country to produce either the radioisotopes or the instruments or devices in which they are used." They can be imported more cheaply. No significant manpower problems are forseen; therefore much of the success nuclear applications may have in a country will be determined by the overall industrial growth itself. The processing and preservation of food appears to be the only agricultural use extensive enough to justify a reactor, but radioisotopes in sufficient quantities could be an alternative source for this and other uses.

5. The most promising application potential is seen in agriculture:

> "The survey indicates certain opportunities, especially in the field of agriculture, as attractive in the near future. On the basis of rough cost allowances and implicit judgments as to the impact on development of the underdeveloped countries of Asia, it appears that the possible uses of atomic energy in grain deinfestation, radiation genetics, and plant physiology might offer important results, in a relatively short time, at relatively modest costs. But even assuming the availability of suitable radiation sources, each of these opportunities requires much more study to establish its economic feasibility in a particular setting."

6. The final section of the survey deals with international co-operation in nuclear energy research and development. The beginnings of some programs are described for several countries. Although some activity has been managed by the underdeveloped countries, much has consisted of the dissemination of information and the provision of aid in training personnel under tehcnical assistance programs. Such activities as student attendance at AEC technical courses in the United States, study tours of U.S. facilities by foreign medical doctors and biological scientists, exchange of information and consultation with AEC personnel by foreign officials and administrators concerned with atomic energy in their own countries, radioisotope shipments from the U.S. Britain and Canada (as part of the Colombo Plan), are all seen as beginnings. The danger is brought out of a specialist who is trained in the "donor" country, where he gains a realistic view as to the costs, timing and other difficulties of an atomic development program, and who, on his return, has too slight an influence unless he can work with many more who have been similarly trained. Means such as the Asian Regional Nuclear Center are said to be invaluable whether assistance comes through a bilateral program, the Colombo Plan, or the International Atomic Energy Agency.

> "The gap between the desires of many foreign countries for applying nuclear energy and their capabilities for doing so appears to be a continuing major problem for the "donor" nations and international agencies. Present programs for disseminating information which deal solely with technical aspects of nuclear science and technology provide almost no background for evaluating the economic and social feasibility of the different nuclear energy applications. Again this points up the need for fact-finding and analyses to establish knowledge of the economic and social aspects of nuclear energy, and thus to help underdeveloped countries view both the near - and long-term role of atomic energy more realistically."

C.J.O.U.

Oka, Takashi.
INDIAN STEEL TOWN SYMBOLIZES HOPES FOR FUTURE AND PROBLEMS OF TODAY.
Christian Science Monitor, Boston, December 12, 1957.
711.16 (540)

1. This is a journalistic account of Rourkela, India's government financed steel town. Selected extracts are given below to provide the background of activity in which this and other new steel towns are coming into being.

2. "Tomorrow's India is still being built. It is the atomic reactor in Bombay, the mighth Bhakra-Nangal dam in the Himalayan foothills, the community development projects now covering almost half of India's 300,000,000 villagers. It is the steel mills going up at Rourkela and Bhilai, Durgapur and Jamshedpur. It is the second Five-Year Plan which is paying for these vast projects, and which is expected to raise per capita income in India from $59 per annum today to about $69 per annum in 1961."

3. "These projects, Prime Minister Jawaharlal Nehru has said, are the 'new temples of our faith.' Their importance is far from merely material. Slowly but surely they are changing the face of India. ...Self-confidence and the desire to progress are replacing resignation and self depreciation. A parched starved land is turning green again."

4. "Rourkela is one of Mr. Nehru's 'new temples.' Here in an iron-rich valley, 256 miles east of Calcutta, 15,000 construction workers are building with West German technical help, what will be Asia's most modern steel plant, capable of turning out 1,000,000 tons of steel ingots a year."

5. "Rourkela symbolizes both India's hopes for tomorrow and its problems of today. It is one of three steel plants being erected by the Indian Government... India needs steel desperately. It is shelling out precious foreign exchange to import 2,000,000 tons of steel annually, for its current production of 1,500,000 tons a year is far from adequate to meet its urgent construction needs. Yet if India can scrape together the capital to build more steel mills, it has more than sufficient resources both of iron ore and of coking coal to produce all the steel it requires. That is why the Indian Government has decided to spend 2,920,000,000 rupees (about $584,000,000) in foreign exchange over the second Five-Year Plan period to build three public steel mills and to expand two private ones. Of the public mills, Bhilai is being financed by Soviet credits and Durgapur is being built on credit by a British consortum. Tata, the largest private mill, is financing its expansion through a World Bank loan. Rourkela alone is so far being financed exclusively by the Indian Government, although recently New Delhi has asked Bonn for a deferred-payments scheme."

6. "Rourkela is no model project. It has suffered, and still suffers, from difficulties typical of yesterday's India--shortages of supply, of financial resources, of trained technical personnel. Indian newspapers have criticized it for being allegedly behind schedule, as compared to the Soviet-financed Bhilai plant."

7. But it is planned to have the first blast furnace in October, 1958: and "the spirit of India's new generation of engineers" intends to keep this target date.

B.E.I.N.O.T.

Redevelopment Authority of the City of Philadelphia (USA)
EASTWICK NEW HOUSE STUDY
August 1957, 66 pages. Illustrations and tables.
711.6 (73)

1. This is the presentation of the Philadelphia Revedelopment Authority's project for Eastwick, an area in the Southwest part of the city, only twenty minutes from the center, which has to date remained largely vacant. Low elevation and poor drainage are now being overcome, however, and the bulk of the area is to be planned as a residential (mainly row-house) community of 10,000 to 12,000 dwellings. This report outlines design considerations and suggestions for new types of row houses and ways of block lay-out.

2. Introductory remarks on the history, present status in construction, possibilities of design, and future of the row house in Philadelphia and elsewhere provide a background for the study. Row houses have been an essential element in Philadelphia since the earliest days. They are still being built, with some size and layout changes, but imaginative design is necessary if they are to fulfill their potentialities during the coming period of urban renewal.

3. The new houses proposed are designed by selection of the possible and tolerable variation of elements of row houses--called "scheme variables." These focus around width of house (16-28 ft.), car storage and traffic, kitchen, stair, bath, yards, interior space, interior vs. exterior space, space for children inside, adult indoor space for living, storage, bedrooms, and furnishhability. By working with feasible variations in these elements, a series of designs was selected. Most are three-bedroom houses.

4. House types which are especially interesting are described below:

"House E" -- having a program of developing a 16 foot row house, avoiding the conventional narrow bedrooms. It is a split-level row type with interior garage, gas fired gravity hot air heating, three bedrooms (146, 125 and 110 sq ft respectively), living room of 268 sq ft, dining room of 140 sq ft, kitchen of 69 sq ft;* house dimensions: 16 ft by 38 ft (total volume: 16,400 cu ft). The lot dimensions are 16 ft by 90 ft, lot area: 1,440 sq ft. Advantages are several. The living room has large, isolated sitting area free from circulation, easy access to bedrooms and garden; the space is easily furnished, and a balcony is provided. The dining room is ample, opens onto the terrace and the garden for easy indoor-outdoor use. The kitchen is efficient with space available for breakfast table, and is a good point for supervision of outdoor play area. The bedrooms, closets and bath are all above FHA minimum standards for six persons. The vestibule provides privacy. Storage and laundry are in convenient location, and the garage permits storage. The garden is adequate even if 10 to 20 feet of the lot depth is eased for a common. There are, however, certain disadvantages. The children's bedrooms are a half-flight removed from the bath. Also the windows of the center bedroom open just above the rear roof line subjecting this room to dirt from the roof, reflected heat and a restricted view.

In general the plan illustrates an excellent solution to the problem of relating levels of sidewalk, garage, service, living and rear yard. In dense areas the house may be placed on the lot with little or no front setback. The bedroom arrangement overcomes the narrow third bedroom which occurs in the conventional 16 foot row house. The powder and

*recreation area of 200 sq ft in addition

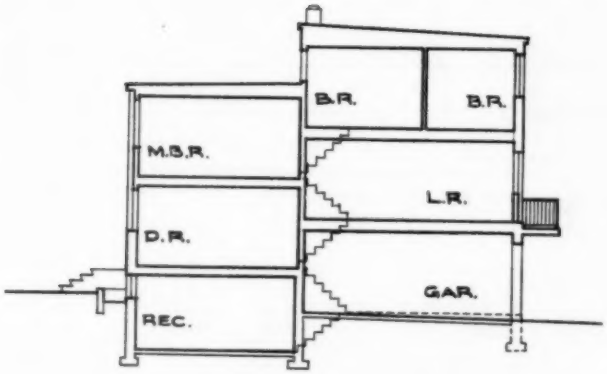
recreational rooms are optional but are desirable for a large or growing family.

5. "House F" -- had as a program to explore the variation in room arrangement in the minimum 18 foot row house. It is a minimum size row house with open parking on the lot, has gas fired hot air heating, three bedrooms (150, 125 and 75 sq ft respectively), a living room of 190 sq ft, dining room of 112 sq ft, kitchen of 110 sq ft and recreation area of 425 sq ft, with house dimensions 18 ft by 32 ft. The floor area is 1,152 sq ft and total volume is 15,552 cu ft. The lot dimensions are 18 ft by 90 ft, giving a lot area of 1,620 sq ft. The advantages of this house are as follows: the living room is close to grade, opens on the garden, cross circulation is eliminated and space is easy to furnish. The dining room combines with the living room. The kitchen is large, includes a dinette, is close to grade and convenient to the street. The bedrooms, closets and bath are above FHA standards for five people. The recreation room is large, with the possibility of an outside stair to the garden. The vestibule provides privacy. Storage and laundry are large and above FHA minimum standards. The garden is private and adequate in size, even if 10 feet of the lot depth is eased to the common. The open parking reduces grading and eliminates terracing. The following disadvantages are noted: the front kitchen does not permit supervision of children in the garden. The first floor near grade places the recreation room below grade. The dining area is dark.

   A front basement-garage may be added by raising the house 7 feet above sidewalk grade. Although the advantages in the size and arrangement remain, easy access from the first floor to grade is lost. Elevation show brick piers at ends of party walls and spandrel walls between. The use of light weight materials is assumed here and the brick piers are retained to buttress the party walls and to prevent the spread of fire from house to house.

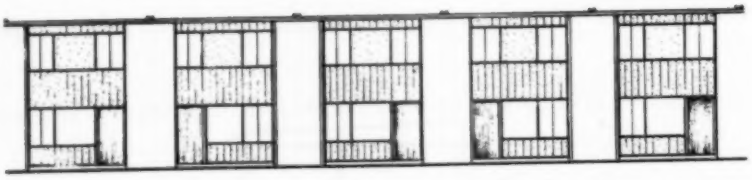
6. "House Jb" -- is the smallest house which meets all requirements as far as the house plan is concerned. Particularly in the second floor plan it contains definite advantages over row house plans of comparable area. It was used in an attempt to design an absolute minimum row house that would incorporate every advantage of basic row building principles. It is a 28 foot "back-to-back row type, with carport or open parking, gas fired, forced hot air heating, three bedrooms (148, 106 and 81 sq ft respectively), living-dining room of 288 sq ft, kitchen-family room of 110 sq ft, but no recreation unless the basement is included. Its total dimensions are 28 ft by 20 ft, yielding a floor area of 1,120 sq ft, and a volume of 12,320 cu ft. Lot dimensions are 28 ft by 60 ft, giving a lot area of 1,680 sq ft. There would be legal problems with the City of Philadelphia, and the FHA minimum property requirements are not satisfied.

   Advantages of this house are the gollowing: Generally, it is compact, efficient and economical. The living-dining area provides an easily furnished space, is close to grade and has direct access to the garden. The kitchen is efficient and also close to grade. The bedrooms, closets and bath are above FHA minimum requirements for five persons. The garden and service areas are private, the drying yard is screened, space is available for vegetable garden, and the concentration of open space

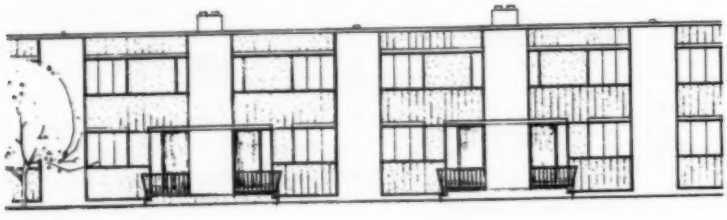


SECTION HOUSE E

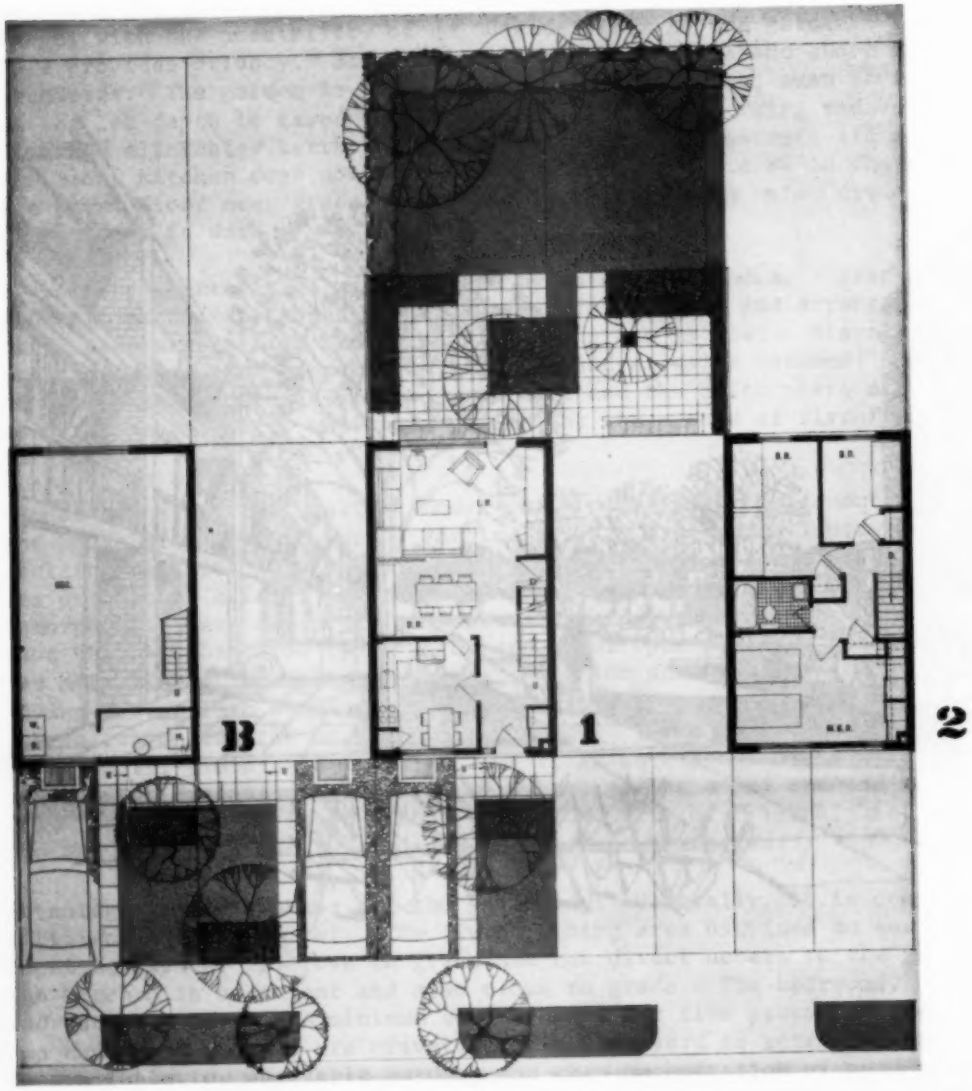
HOUSE F



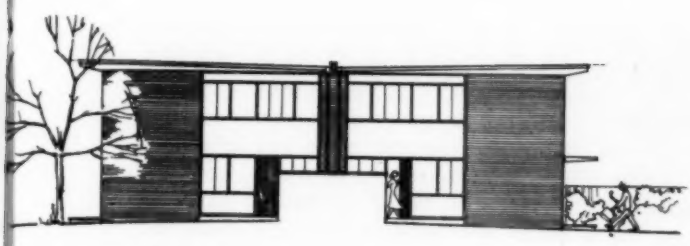
GARDEN ELEVATION



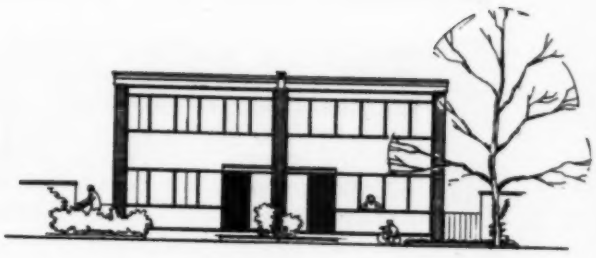
STREET ELEVATION



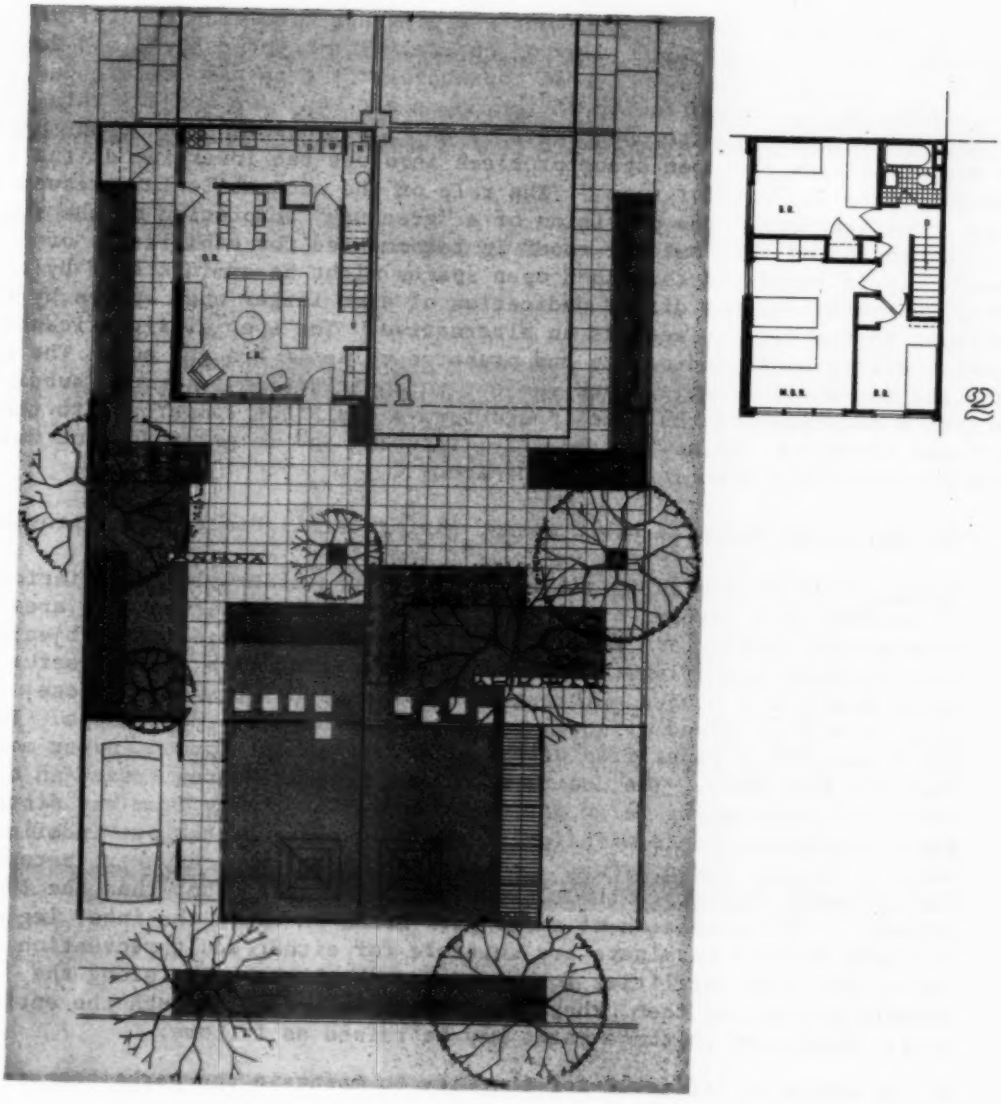
HOUSE Jq



SIDE ELEVATION



STREET ELEVATION



at the side of the house is particularly desirable if the lots or blocks are shallow. Disadvantages cited are these: To insure adequate summer ventilation, an exhaust fan is required. There is only one exposure. And the approach from the street to the house is through the private garden. Houses of this sort, probably among the most economical, are based on the back to back arrangement in which all open space is unified on one side of the house. Although this does not conform to the ideal street-house-land relationship basic in the design standards, it substantially reduces land and construction costs. It requires a completely different treatment of garden and open service areas from the other houses. The concept is unfamiliar and warrants considerations. The exterior wall requires special treatment to overcome having only one exposure.

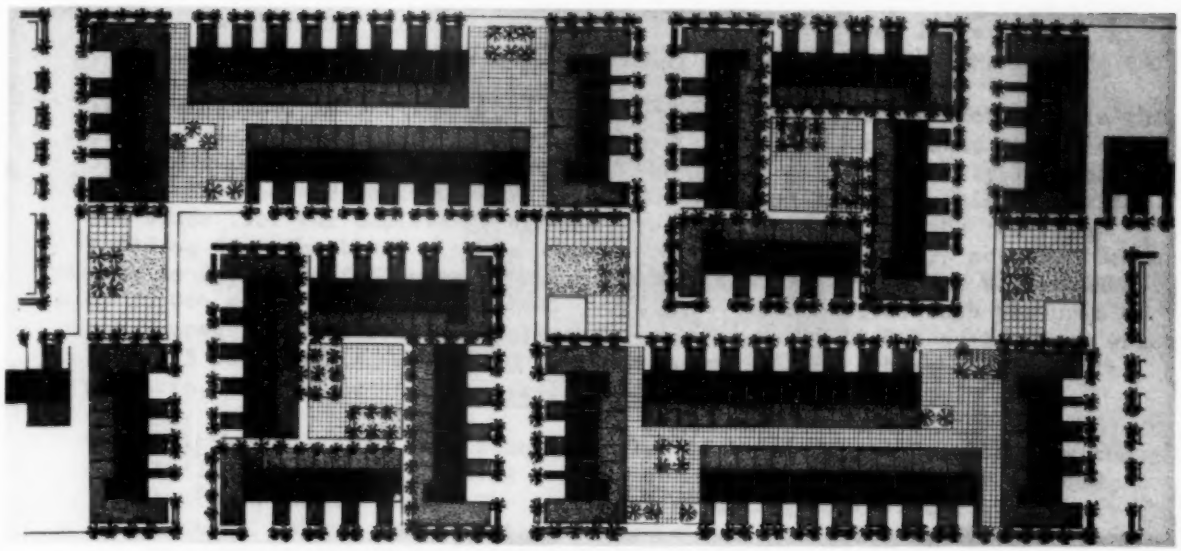
7. Thirteen designs for block layout are presented, holding generally to principles but allowing a wide play of choice. The net density aimed for is between 14 and 18 per acre. Several considerations of open space are dealt with, including the organization of the house and its open space within the lot and relation of private open space to walks and other public open space. One way of solving the open space problems involves the inversion of the house plan to create an "outdoor room." The role of the automobile is stressed in these considerations. The provision of a "greenway" adaptation of the square as an extension of the "outdoor room" is recommended for a hierarchy of open spaces. It is suggested that such open spaces might be administered by an owners' corporation, but direct dedication of some larger open spaces by the developer to the city is seen as an alternative. The special significance of street trees to avoid mediocrity and preserve value is brought out. The block plans suggested are idealized and subject to modification in actual subdivisions. Statistics accompanying the block plans form a basis for comparison to the conventional Block X. Gains in stability, in value and in permanance of value through sound block planning are emphasized.

8. Following are selected block plans, giving detail descriptions provided:

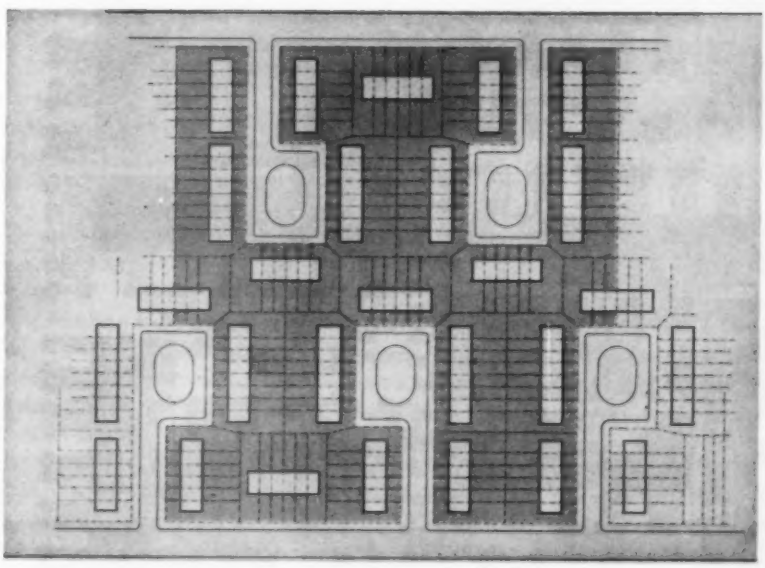
"Block 7" -- This plan is a combination of one block plus a variation on another in a pattern of alternating loop streets serving the area between two "collector" streets. It has many advantages over objectionable features appearing in some other plans: The loop streets serve about 80% of the houses. Through traffic does not travel on these streets and the speed of local traffic is reduced by their shape. Every house has purely pedestrian access to a substantial common, never more than 150 feet away. The positions of the rows of houses create an orderly but interesting large scale pattern with variety from any vista. Short vistas alternate with longer ones but none stretch out indefinitely and all include green areas. The pedestrian may walk anywhere between the collector streets without crossing any streets other than the loop streets. The succession of small park areas on which the inner leg of the loop streets terminate are suitable for either adult recreation or restricted play facilities for children. With the walks along the streets connecting them, they form a walkway system through the entire area. Objection to these parks may be raised as follows:

a. It would be difficult for the City to maintain the parks because they are small and numerous

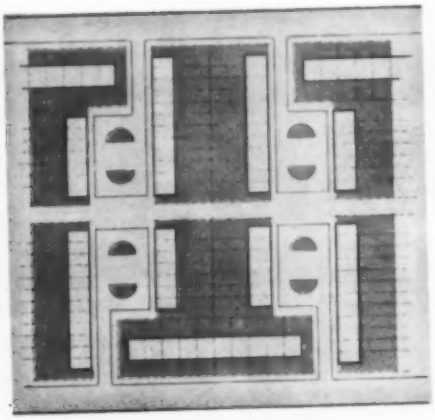
BLOCK 7



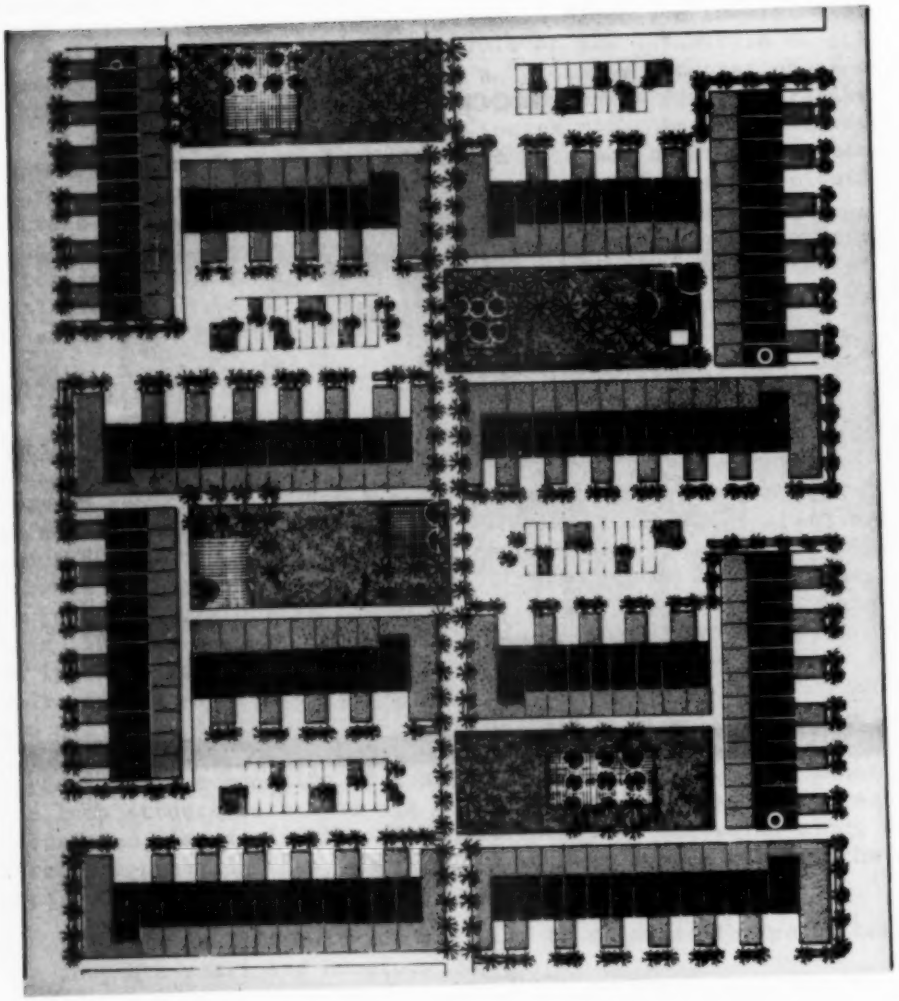
BLOCK 8



BLOCK 10



BLOCK 13



Redevelopment Authority... Philadelphia. Eastwick new house study -4

b. Since they are nearly the same size as the more private open areas within the blocks they are not as useful as fewer larger areas would be.

The open space, loop streets, visual interest and variety are achieved in this plan at almost no increase in street and utility cost (estimated at not over 3%) and a decrease in density from the conventional block of only 3 homes per acre. There are 8 duplex and 74 eighteen-foot row houses in this plan with lot sizes (for the duplex) of 3,780 or 4,150 sq ft and (for the row type) 1,620 sq ft. The block area is 6.07 acres (less streets, 4.27 acres). Common area is 29,216 sq ft; interior common walks total 18,760 sq ft; street makes up 51,064 sq ft (623 sq ft per unit, with 33.4 lineal ft of curb per unit on the average). Five-foot sidewalk has a total area of 14,064 sq ft area, which is 171.5 per dwelling unit. The gross density in this scheme is 13.5 units per acre, and the net density is 19.2 per acre.

9. "Block 8" -- This is a schematic plan of a cul-de-sac developed by the Philadelphia City Planning Commission. It is now being used by home builders in the city. The interlocking arrangement of the alternate streets reduces the amount of unusable land and holds density to almost the same figure as conventional blocks. It is comparable to block 7 in visual interest and variety. In this plan all interior space is assumed to be private gardens but walkways and common space may be created by minor design variation.

There are 37 dwelling units in this scheme (based on one cul-de-sac unit), 26 of which are 18 ft row house type with the rest being end types. Lot sizes vary between 1,800 sq ft and 2,340 sq ft (most have 1,890 sq ft) in the row houses; and they are between 3,150 sq ft & 4,400 sq ft in the end types. A complete cul-de-sac has 2.91 acres (less street right of way, 2.1 acres). The street cartway, including the entire cul-de-sac is 22,890 sq ft, which is 619 sq ft per unit and gives an average curb per unit of 28.4 lineal feet. Public sidewalk totals an area of 5,250 sq ft or 142 ft per unit. Gross density is 12.8 and net density is 17.6

10. "Block 10" -- The much discussed objection of the difficulty of running sewers and utilities through the area between mains on collector streets is treated in this scheme. Such utilities may be laid without difficulty in these opposed cul-de-sac streets. Though the pattern is a bit rigid, it is far more varied than the usual neighborhood. The appearance and usefulness of this design would be particularly good if the center of the long "super-block" were penetrated by a walkway so that the view up each cul-de-sac or court ended in open green space.

Of the total 24 units in this scheme, 15 are 18 ft row 4 are end of row. 4 are 27 ft row with one more end-of-row. Lot sizes for the 18 ft row are 1,620 sq ft; for the 27 ft row 2,430 sq ft; and for the end types between 2,700 and 3,780 sq ft. The block area for one complete cul-de-sac unit is 1.84 acres (less street right-of-way, 1.24 acres). The common area walk at the end of the cul-de-sac makes it 4,560 sq ft. The total street cartway of the cul-de-sac is 18,360 sq ft, which is 765 sq ft per unit. An average of 36.8 lineal feet of curb per unit (not including islands in the cul-de-sac) is provided. Sidewalk totals 4.020 sq ft or 167.5 sq ft per unit. Gross density is 13.0 per acre and net density is 19.4

Redevelopment Authority... Philadelphia. Eastwick new house study -5

11. "Block 13" -- Again the basic cul-de-sac is combined with another type of interior common space but here both the courts, one for the car and one for play and recreation, abut a walkway. This necessitates a new approach for ownership and care of these green area. In Block 7 and some other schemes, the green areas were almost completely enclosed and their care would probably fall to an owner' association or a private management organization. In Block 13, however, they are open to the major walkway for policing and maintenance. Public ownership and care are feasible. Also this design permits sewer, water and utility lines to be carried through the block. The omission of houses marked "0" creates a sufficient right-of-way for these services to pass between collector streets in a straight line.

Of the 34 dwelling units in Block 13, most (31) are 18' row type, while 2 are duplex ends, and one is an end or row. Lot sizes for these three types are, respectively, 1,620 sq ft, 3,780 sq ft, and 3,240 sq ft. The total block area is 2.61 acres (less streets, 1.82 acres); and within this 18,480 sq ft are common area, 6,780 sq ft are in interior common walks, 25,480 sq ft (750 sq ft per unit) are in streets, including cartways and cul-de-sac, and 4,500 sq ft (132 sq ft per unit) are in sidewalks. Concerning streets, 30.1 lineal feet of curb per unit was the average provision. Gross density is 13.0 dwelling units per acre, while net density is 18.7

12. Cost analysis and construction details are worked out for the several types of house designs. Cost comparisons are made among selected designs and with conventional models, and savings in construction are said to be more than sufficient to compensate additional development costs. Several changes from conventional materials and methods of construction were recommended. These had to do with methods of roof framing, solid or frame prefabrication of front and rear walls (requiring a flexibility in the present building code), certain interior partitions (if costs can be lowered), prefabrication of kitchens, baths and mechanical work (if they can be competitively produced). Modular construction was considered but found difficult to exploit in row houses: however, "the designs herein and any others which are based on more "open" planning (fewer enclosures of space) can more readily take advantage of modular methods than can older plans which have more rigid room division, more partitions and fewer uninterrupted wall, floor and ceiling surfaces." A final chapter gives technical proposals for governmental and legal mechanisms to effect the designs in their setting.

B.N.P.

United Nations. General Assembly.
ECONOMIC DEVELOPMENT OF UNDER-DEVELOPED COUNTRIES.
Twelfth session, A/3782, December 13, 1957. pp. 13-18
341.16: 336 (100)

1. This is the Report of the Second Committee, to consider the establishment of a Special United Nations Fund for Economic Development. Fifty-four nations took part in the debate prior to the consideration of the draft resolution in its amended form. The draft resolution as a whole was unanimously adopted by a roll-call vote of 72 votes to none with no abstentions. (Three details of wording, voted separately, received 9 abstentions but no votes against and 63 in favor.) The Second Committee therefore recommended that the General Assembly adopt the draft resolution III, some of which we extract below:

2. "The General Assembly... Decides that, subject to the conditions prescribed hereunder, there shall be established as an expansion of the existing technical assistance and development activities of the United Nations and the specialized agencies a separate Special Fund which would provide systematic and sustained assistance in fields essential to the integrated technical, economic and social development of the less developed countries,

3. "Decides further that, in view of the resources prospectively available at this time, which are not likely to exceed $100 million annually, the operation of the Special Fund shall be directed towards enlarging the scope of the United Nations programmes of technical assistance so as to include special projects in certain basic fields to be defined by the Preparatory Committee provided for in paragraph 4 below, for example, intensive surveys of water, mineral and potential power resources; the establishment, including staffing and equipping, of training institutes in public administration, statistics and technology, and of agricultural and industrial research and productivity centres;

4. "Considers that while, without impairing the separate identity of the Special Fund, the fullest possible use should be made of the existing machinery of the United Nations, the specialized agencies (including the existing international financial institutions) and the Expanded Programme of Technical Assistance, the Special Fund will require some new administrative and operational machinery;

5. "Decides to establish a Preparatory Committee composed of representatives of (number to be decided when report considered by the General Assembly) Governments to do the following, taking into account the principles set out in the annex and the views and suggestions forwarded by Governments pursuant to paragraph 7 below:

a. Define the basic fields of assistance which the Special Fund should encompass and, within these fields, the types of projects which should be eligible for assistance;

b. Define in the light of paragraph 3 above, the administrative and operational machinery to be recommended for the Special Fund, including such changes as may be required in the present legislation and procedures of the Expanded Programme of Technical Assistance.

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c. Ascertain the extent to which Governments would be willing to contribute to the Special Fund;

6. "Requests the Preparatory Committee to submit the results of its work the form of a report and recommendations to the twenty-sixth session of the Economic and Social Council; Requests the Economic and Social Council to transmit the Preparatory Committee's report, together with its own comments, to the thirteenth session of the General Assembly for final action; Looks forward to the establishment of the Special Fund as of 1 January 1959."

7. "Decides that as and when the resources prospectively available are considered by the General Assembly to be sufficient to enter into the field of capital development, principally the development of the economic and social infrastructure of the less developed countries, the General Assembly shall review the scope and future activities of the Special Fund and take such action as it may seem appropriate."

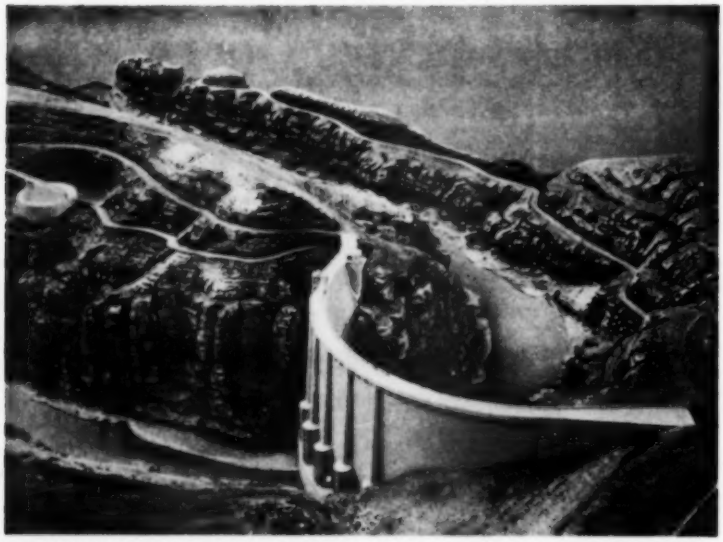
8. (ANNEX) "I. The Special Fund shall be a multilateral fund of the United Nations, with financial resources principally derived from voluntary contributions of Governments and others in (or transferable into) currency usable by it and as much as possible pledged or indicated for a number of years.
II. Assistance from the Special Fund shall be given only to projects which would make a contribution to the economic development of the requesting country or countries. The operations of the Special Fund shall be in conformity with the principles of the Charter of the United Nations and shall not be influenced by political considerations.
III. The Special Fund shall be administered by a chief executive officer under policies established by an executive body in accordance with such rules and principles as may be laid down by the General Assembly and the Economic and Social Council. The membership of the executive body shall be equally distributed between two groups, one consisting mainly of major contributing countries and the other consisting mainly of less developed countries. Each member of the executive body shall have one vote. Decisions of the executive body on questions of policy, including the allocation of funds, shall require a qualified majority vote."

GENERAL

The Illustrated London News.
THE DOKAN DAM PROJECT - A part of Iraq's great development programme.
April 13, 1957, p. 591.

1. ..."The water to be provided by the dam will be used to irrigate some 2000 square miles of desertland. The 4000 farmers whose land will be inundated by the reservoir are to be resettled in an area to the north of the dam. The power station which is to be built in the Dokan Gorge is expected to produce enough light and power for a city eight times as large as Baghdad. The dam is on the Lesser Zab River and is situated about 40 miles north-west of Sulaimaniyah."

THE REGION WHERE THE NEW DAM IS BEING BUILT: THE DOKAN GORGE, THE SITE OF THE DAM, CAN BE SEEN ON THE UPPER RIGHT-HAND SIDE.

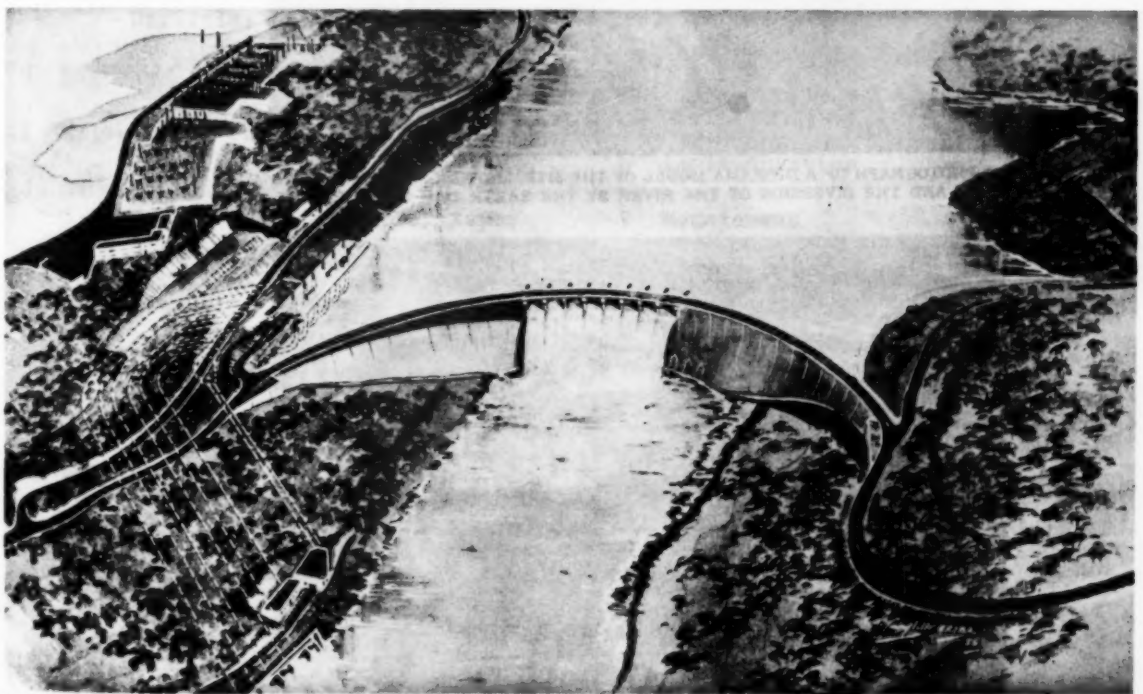


THE DAM AS IT WILL APPEAR FROM THE AIR WHEN COMPLETED: A PHOTOGRAPH BY HUNTING AEROSURVEYS OF
A SCALE MODEL.

The Illustrated London News
Creating the world's largest man-made lake: HOW THE HUGE KARIBA DAM IS BEING BUILT.
July 29, 1956, p. 141.

1. ..."The Kariba Dam, a huge hydro-electric project, ...will create the world's largest man-made lake in the Zambezi Valley and supply to the Federation of Rhodesia and Nyasaland in its first stage 500 megawatts of electric power and in its final completed stage 1200 megawatts."

THE FIRST PHASE IN MAKING THE KARIBA DAM—LOW-WATER SEASONS, 1955 AND 1956: AN ARC COFFER DAM IS BUILT OVER A DIVERSION CHANNEL ON THE LEFT BANK, WITH A DIVERSION TUNNEL IN THE RIGHT BANK.



FIRST FINAL STAGE: THE DAM COMPLETED AND OVERFLOWING. IN THE RIGHT BANK (LEFT ON PICTURE) DOTTED LINES SHOW THE UNDERGROUND INTAKES AND THE SIX TAIL RACES. ON THE LEFT BANK, ABOVE THE DAM, AN ARCHED COFFER DAM IN READINESS FOR FURTHER DEVELOPMENT.

The Illustrated London News
To increase Thailand's rice production: THE NEW DAM AT CHAINAT
March 23, 1957, p. 460.

1. "The dam is situated about 124 miles north of Bangkok and, together with a system of canals, formed part of a scheme first thought of before the First World War. The canals were begun after the First World War, and are expected to be completed in 1958. Construction of the dam, originally planned to begin in 1940, was hald up by the Second World War and was not begun until 1951.

2. The new dam at Chainat, in Thailand, which was opened by King Bhumibol Adulyade on February 7, 1957, will be of great assistance to the country's rice growers and farmers as they can now rely on artificial irrigation, and are no longer dependent on the uncertain seasonal rainfall.

A PHOTOGRAPH OF A DIORAMA MODEL OF THE SITE, SHOWING THE COMPLETED DAM AND THE DIVERSION OF THE RIVER BY THE EARTH DAM ON THE RIGHT.

AN AERIAL VIEW OF THE SITE WHERE THE DAM HAS BEEN BUILT. THE SAME SITE, AFTER COMPLETION OF THE DAM, IS SEEN ON THE RIGHT.

E K I S T I C S

HOUSING & PLANNING ABSTRACTS

CLASSIFICATION SYSTEM USED BY DOXIADIS ASSOCIATES

A The Problems

B The Policies

C The Programs

D People, Development, and Ekistics**
- Geographic factors
- Social factors
- Industry
- Agriculture
- Transportation

E Houses

F Structures
(exclusive of Houses)

G Community services
- Utilities and Social Services

H Regions

I Major urban centers

J Market towns
- Medium-sized and small towns
- New towns

K Villages
- Rural land

L Farms

M Surveys
- Census data
- Topographical surveys

N Research
(and Technical Education)

O Planning
(and Landscaping)

P Financing

Q Urban land

R Labor

S Materials

T Construction
- Systems of Building and Costs

U Implementation

V Management

W Administration

X Legislation

**Refers to centers of activities in relation to their surrounding regions.